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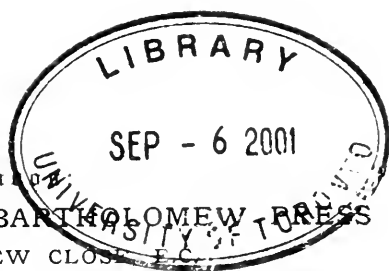
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Founded in 1887 by **MORELL MACKENZIE** and **NORRIS WOLFENDEN**.

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THE
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**SOME PRACTICAL CONSIDERATIONS IN THE DIAGNOSIS
AND TREATMENT OF ABSCESS OF THE CEREBELLUM
WITH A RECORD OF CASES SUBJECTED TO OPERATION.¹**

BY SIR WILLIAM MILLIGAN, M.D.

THE relative frequency of temporal lobe abscess as compared with cerebellar abscess is still a matter of controversy.

Heimann gives the proportion as 68·3 per cent. of the former to 31·7 per cent. of the latter; Neumann 63·4 per cent. to 46·6 per cent. Such a small difference is, therefore, comparatively speaking, of no importance and substantiates what has generally been taught, viz., that cerebral abscesses occur twice as frequently as cerebellar. Curiously my own experience has been precisely the reverse, having, in the course of practice, seen almost three times as many cerebellar as cerebral abscesses. The decades of life from 10-20 and from 20-30 undoubtedly provide the largest number of cases, while males are affected twice as frequently as females, and in my own experience abscess upon the left side is twice as frequent as abscess upon the right side.

The actual route of infection provides an interesting pathological study. In acute cases the sequence of events is, as a rule, the formation of an extra-dural abscess in the posterior fossa or

¹ Paper read before the Section of Surgery at the meeting of the British Medical Association, Aberdeen, July, 1914.

a thrombosis of the lateral sinus with secondary infection of brain tissue, whereas the great majority of chronic cases are secondary to labyrinthine suppuration, the aqueductus vestibuli affording the actual path of communication in nearly 30 per cent., the other usual routes of infection being the result of sinus thrombosis and extra-dural abscess in relative order of frequency.

The fact that the labyrinth has of recent years been proved to play such an important rôle in the production of posterior fossa suppuration has naturally tended to focus attention upon those signs and symptoms which might be of clinical assistance in the differential diagnosis of cerebral, cerebellar, and labyrinthine suppuration.

Of the many important clinical indications no one is of more importance than nystagmus, the proper interpretation of which may be the means of securing an accurate differential diagnosis and consequently a correct method of surgical approach to the existing focus of suppuration.

Of the two components the primary or slow is the true vestibular reflex, although in actual practice the direction of the secondary or quick movement is the one which is held to determine the particular type of nystagmus present. When the quick deviation is to the right the nystagmus is spoken of as a right nystagmus, when to the left as a left nystagmus.

Nystagmus may be spontaneous or induced, vertical, horizontal, or rotatory.

In uncomplicated disease of the labyrinth it is at first directed towards the affected side, but soon changes over and is directed to the opposite or sound side. It remains directed towards the *sound* side throughout the course of the disease, and as the function of the labyrinth is gradually destroyed it becomes less and less obvious until finally it disappears.

On the other hand, a spontaneous nystagmus, the result of suppuration within the cerebellum, is directed first towards the sound side and very shortly afterwards towards the affected side. It remains throughout the course of the disease directed towards the *affected* side and increases, *pari passu*, with the progress of the suppurating focus within the cerebellum. It is true that it may also incline towards the sound side, but the greater and more obvious deviation is invariably towards the affected side.

Important as the differential diagnosis of labyrinthine and cerebellar suppuration is, the recognition of the fact that cerebellar suppuration complicates labyrinthine suppuration in a given case is

of almost more importance from the clinical standpoint. Under such circumstances an estimate of the irritability of the labyrinth is of the greatest value. Thus if a rotatory nystagmus be present towards the *affected* side and the labyrinth be found non-irritable an immediate diagnosis of cerebellar abscess may be made, more especially if symptoms of intra-cranial pressure be present at the same time.

If, however, a rotatory nystagmus be present toward the *sound* side and the labyrinth be non-irritable the lesion may be either labyrinthine or cerebellar, and it is not possible to arrive at a definite diagnosis without first performing a labyrinthectomy.

If the nystagmus were of labyrinthine origin it would, after operation, disappear within a few days, if of cerebellar origin not only would it persist, but it would become more marked, while not infrequently its direction would be reversed and towards the affected side.

In estimating the degree of labyrinthine irritability, the caloric test, irrigation of the ear with hot or cold water, is the most convenient, the most easily applied, the least distressing to the patient, and moreover has the great advantage that it can be applied to one side at a time, and with the patient in bed or in a sitting posture.

For the cold water test, water at a temperature of 27°C . or 80°F . should be employed; for the hot water test, water at a temperature of 110°F . The time required for the induction of nystagmus depends upon certain extra-labyrinthine factors, whereas the duration of the nystagmus depends upon intra-labyrinthine or central conditions. To fix the position of the semicircular canals an oto-goniometer is employed. The upper rod of the goniometer, to which is attached a graduated arc, moves in a vertical plane, whereas the lower moves in a horizontal plane. To the distal end of the horizontal rod, which moves across the upper surface of a graduated arc, is attached a small mirror.

The object of a vertical rod is to determine the position of the external semicircular canal. If the head be held in the upright position and the vertical rod be raised through an angle of 30° its plane will correspond with the plane of the external, misnamed horizontal, semicircular canal, and if it, the head, be now bent backwards until the rod is vertical the plane of the external canal will be vertical also.

The lower rod with its attached mirror is used to fix the position of the eyes, being rotated through an angle of 50° to one or other side of the median line, according to whichever ear is being

tested, and until the patient is able to see distinctly some object in the room reflected in the mirror.

To perform the caloric test the water from the calorimeter is allowed to flow into the auditory meatus, the rate of flow being so regulated that 300 c.c. flow through in three minutes. In a normal ear with an intact membrana tympani nystagmus would be induced in from thirty to forty seconds, or after about 70 c.c. of water had passed through the apparatus.

When cold water impinges upon the outer labyrinthine wall it cools the endolymph in the most superficial parts of the canals, that is the anterior portion of the external canal, and the ampulla of the superior canal, with the result that a movement is induced in the fluid owing to the difference of specific gravity between the cold and warm portions of the endolymph. If the cold water is run into the right ear the endolymph in the ampulla of the right superior canal becomes rapidly chilled. The diminution in temperature makes it heavier with the result that it falls towards the utricle. This creates a convection current towards the utricle, and as each portion of the fluid flowing from the superior canal comes under the influence of the cold water flowing through the meatus it likewise becomes cooled, with the result that the whole of the endolymph becomes ultimately of the same temperature. In this way a rotatory nystagmus to the opposite side is produced.

The horizontal canal is normally tilted backwards about 30° . As the cold water reaches its anterior portion the endolymph is cooled and flows downwards, that is away from the utricle, with the result that a horizontal nystagmus is produced also to the opposite side.

To secure the most marked and rapid effects with the caloric test the head should be placed in the *oblique optimum position*, that is bent backwards through an angle of 60° and tilted towards the corresponding shoulder through an angle of 45° . In this position an almost pure horizontal nystagmus to the opposite side is produced.

The caloric test, moreover, permits of a separate examination of the external and the vertical canals. Thus if the head is placed in the *oblique optimum position*, that is, bent backwards through an angle of 60° and tilted to the same side through an angle of 45° , and the caloric test be applied without inducing nystagmus then the external canal is not functioning. If now the head is thrown forwards into the *pessimum position*, i. e. 30° forwards from the vertical upright position, and the test re-applied and a rotary

nystagmus be induced the vertical canals are intact. In this way it is possible to diagnose a circumscribed labyrinthitis confined to the external canal.

In a case of suspected right labyrinthitis with spontaneous nystagmus to the left we irrigate the ear with hot water. If the labyrinth is still functioning a nystagmus to the right is set up which neutralises or may even overcome the nystagmus to the left, but if, on the other hand, the nystagmus is unaffected, the labyrinth is not functioning normally.

The more irritable the labyrinth the more rapid the incidence of nystagmus, and *vice versa*, due allowance being made for such pathological conditions as may influence temperature conductivity.

In labyrinthine disease the tendency to fall is always in the direction of the slow component of the nystagmus, in other words, in a direction opposite to the observed nystagmus or towards the affected side, whereas in cerebellar lesions the tendency to fall is independent of the direction of the nystagmus.

It is now held that there are central centres of co-ordination in each cerebellar hemisphere which regulate the ipso-lateral movements of the limb, while similar centres in the verms regulate the head, neck, and trunk movements.

Injury, whether experimental or from disease, to definite areas of the cerebellar cortex produces disturbances of a functional nature in muscle groups of the same side, while if the injury be very severe the centres governing the whole limb may be implicated. It would appear as if there existed a centre in the cerebellar cortex for each movement of a limb, and for each articulation, for flexion and extension, for adduction and abduction, etc.

Localised lesions of the cerebellum induce an *anisosthenia* or disturbance of that equilibrium which normally exists between antagonistic groups of muscles. Hence the clinical significance of Bárány's pointing-by test.

In lesions of the labyrinth the pointing-by test is in the direction of the slow component of the nystagmus, that is, in a direction opposite to the observed nystagmus. In cerebellar lesions this reaction is lost. For example, in the case of a left-side suppurative middle-ear lesion, where it is difficult to determine whether a labyrinthitis and a cerebellar abscess co-exist, the spontaneous nystagmus is to the right or sound side and the pointing-by test to the left. In such a case the lesion may be either labyrinthine or cerebellar. If now the right ear be irrigated with cold water, a nystagmus to the left is produced. If it be a labyrinthitis the

pointing-by test will be to the right, whereas if it be a cerebellar lesion the reaction is lost and the pointing-by test of the left leg or arm is to the left, in other words, to the side of the cerebellar lesion.

In certain cases also the presence of *dysdiadokokinesis* or an impairment of the movements of pronation and supination is an important indication. In four of my cases it was quite marked, the movements being made (as compared with those of the opposite side) slowly and clumsily and with the aid of the shoulder-joint muscles.

The fact that intra-cranial suppuration develops as a rule in the immediate proximity of the septic focus to which it owes its origin, and the fact also that labyrinthine suppuration is the proximate cause of cerebellar suppuration in from 40 to 50 per cent. of cases, naturally suggest that any intra-cranial abscess which may be present will be found in the lateral lobe of the cerebellum and well forwards. Hence the ideal surgical approach to such an abscess is through the posterior wall of the petrous portion of the temporal bone in the space between the lateral sinus and the internal auditory meatus. Exploration along this route is much more likely to be the means of discovering an existing abscess than exploration behind the groove of the lateral sinus.

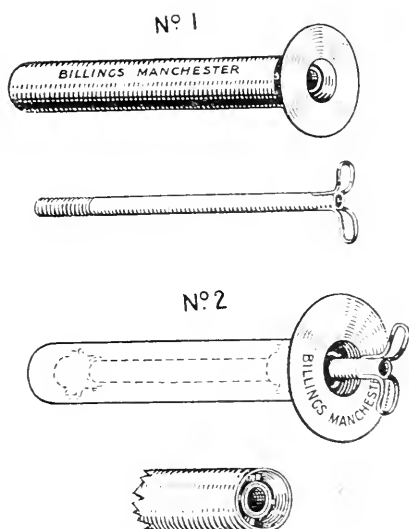
Prior to any exploration, however, I am in favour of withdrawing a few drachms of cerebro-spinal fluid by lumbar puncture in order to obviate the incidence of sudden arrest of respiration or cardiac failure, a by no means unknown phenomenon in lesions of the cerebellum. Objection has been made that the withdrawal of cerebro-spinal fluid prior to operation and the consequent decrease of intra-cranial pressure thereby resulting may cause a cerebellar abscess, superficially situated, to burst into the meninges. While admitting the possibility the chances of its happening are very remote if only a few drachms of fluid are removed, whereas the possibility of sudden death during operation from undue intra-cranial pressure is now not only recognised by all operators, but has frequently actually taken place on the operating table. In an analysis of 196 cases of cerebellar abscess made by Neumann in 10 instances death took place from sudden respiratory failure.

In three of my own cases operation was successfully completed while artificial respiration was kept up owing to sudden paralysis of the respiratory centres.

On the other hand if too much fluid be withdrawn the brain stem may fall downwards into the foramen magnum or may even become twisted.

In my earlier operations I was in the habit of opening the cerebellum behind the lateral sinus and, unfortunately, frequently missed the abscess, which was subsequently found situated far forwards and inwards in the immediate neighbourhood of the internal auditory meatus.

During the last few years I have invariably explored through the posterior antral wall, and have rarely missed finding the collection of pus, which, as a rule, is fairly superficial and at the same time of comparatively small size—small at any rate as compared with temporal lobe abscesses.



Drainage tube for abscess of the brain.

One of the most difficult problems in the treatment of intra-cranial suppuration is the question of the maintenance of free drainage. In acute abscesses the tendency is for the walls of the so-called cavity to fall together, hence the problem of drainage presents no great difficulty, a few strips of gauze inserted into the cavity being sufficient to ensure the continuous escape of secretion. In chronic abscesses where one has to deal with a pyogenic membrane of a varying degree of thickness and resistance, and where healing is the result of progressive agglutination of granulation tissue, the matter is entirely different, as it is necessary to maintain uninterrupted drainage until this process is complete. Every surgeon who has had to deal with such cases knows full well how the tube employed is prone to become blocked with fragments

of brain tissue or inspissated pus, and how, as the result of retention of secretion, pressure symptoms reassert themselves. I would, therefore, like to put in a plea for the more frequent employment of counter-drainage, which I have found of great service. The objection offered to counter-drainage, viz. that another wound is made in the dura and in the brain substance itself, is to my mind quite counter-balanced by the fact that a free path for efficient irrigation is provided, and that the removal of the tube for cleansing purposes is done away with, to say nothing of the practical difficulties frequently experienced in returning the tube to its proper habitat.

If the primary opening be made, as already suggested, through the posterior antral wall, the secondary opening should be behind the groove of the lateral sinus and a tube should be inserted through both openings.

If a rubber tube be employed it is advisable to wrap it round with a thin layer of gauze so as to permit of the continuous escape of fluid secretion. My practice is to insert a small rubber tube through the opening made in the posterior antral wall and a silver tube of special construction through the opening made behind the lateral sinus. The silver tube (Figs. 1 and 2) consists of a tube within a tube so arranged that while a space normally exists between the two tubes for the exit of fluid secretion, the inner tube may, should necessity arise, be unscrewed and removed without in any way interfering with the position of the outer tube.

The results following operative interference for the relief of abscess of the cerebellum still leave much to be desired. When it is remembered, however, what a large percentage of the cerebellar abscesses met with in actual practice are complicated by the presence of sinus thrombosis or posterior fossa meningitis the wonder is that statistics are not worse than they actually are.

I venture, Mr. President, not, however, without a feeling of trepidation, to place the results obtained during the past ten years of practice before you.

Number of cases operated upon, 27. Males, 17; females, 10. Side: right, 7; left, 20. Cured, 17. Died, 10.

LATENT EMPYEMATA OF THE NASAL ACCESSORY SINUSES.¹

BY OLIVER STJOHN GOGARTY, B.A., M.D.DUBLIN.

Nothing is more remarkable to anyone who has had experience of rhinology than the variation in the tolerance of individuals to nasal disease. There is a wide difference between the case where protruding polypi are borne with apparent apathy, and the hyper-sensitive cases in which an attack of nervous coryza can be almost induced by suggestion. And yet I have found even the most sensitive cases to harbour grave pathological conditions that gave rise to no localising signs. The explanation of how such cases can exist lies in the fact that the greater proportion of certain affections of the nose are often uncharacteristic; and, secondly, in the existence of a certain sufferance that rises to resignation in even sensitive cases when the disease is so usual and of such common occurrence as neither to elicit interest or sympathy nor to hold out the prospect of an outright cure.

In a review of 300 cases in which I operated on the antrum of Highmore or accessory sinuses by far the greater portion were cases of chronic disease.

35 were cases of acute dental infection.

6 " " cysts.

2 " " carcinoma.

2 " " osteomyelitis.

1 was a case of sphenoidal sinus suppuration.

1 " " frontal lobe abscess.

Therefore over 250 were cases of a chronic nature varying from polypus and visible pus to merely "catarrh." Indeed, the majority of these cases came complaining of "catarrh," by which term the public designates nearly every form of nasal discomfort or discharge that is not associated with pain. The term "neuralgia" is used for painful conditions.

The following six cases form the subject of this paper, wherein there was neither atypical hypertrophy, mucus extravasation, congestion, nor when that misleading toy, the transilluminating lamp, was used, was there any shadow. Neither was there any subjective symptom sufficiently local to lead patients to attribute the cause of their disease to the nose or to its allied sinuses.

¹ Read at the meeting of the British Medical Association, Aberdeen, July, 1914.

CASE 1.—About two years ago a lady came to me complaining of neuralgia in the eye and on the right side of the face. Eye, nose, and teeth were normal. I found an empyema of old standing in the right antrum Highmorii. The patient was anæsthetised. I opened the antrum Highmorii by trephining through the canine fossa, denuded it of its degenerated mucosa, packed it during the operation with tampons soaked in tincture of iodine, and drained it into the nose by removing the anterior third of the maxillary plate of the turbinal organ together with its periosteum. The patient left hospital in a week. Twelve months later she came to me complaining of a return of the neuralgia in a severer form than before. I satisfied myself that there was no pus coming from the frontal sinus or ethmoidal labyrinth. The neuralgia continued and increased in severity. The patient became sleepless, had fainting attacks, and became greatly emaciated in appearance. In a few months her hair turned completely grey. A condition which closely resembled angio-neurotic œdema supervened. The right cheek used to become puffy and of dusky livid hue, while the upper and lower eyelids swelled so that the eye was closed. This usually was accompanied by paroxysms of pain. I began to have misgivings as to the integrity of the frontal sinus and the accuracy of my earlier observations. The patient was averse to further surgical interference because neither I nor any of the other rhinologists whom she consulted could say that the cause was in the frontal sinus. All I could do was to ask her to allow me to explore the frontal bone for empyema of the sinus or bulla frontalis. As her condition became unendurable this she allowed me to do. I found the bone thickened to three-quarters of an inch. I exposed the dura and satisfied myself that it was not unduly tense. I found neither frontal sinus nor bulla frontalis. The removal of the thickened bone, however, has completely cured the case. There was no obtainable evidence of inherited or acquired syphilis.

CASE 2.—A gentleman, aged about fifty, complained of a clear tear-like drop from the left nostril. If he took exercise in cold weather, such as hunting, it became greatly increased—almost continuous. When I saw him the anterior naris was slightly eczematous, but there was no abnormality of the nose nor any conjunctivitis. Thinking that there might be some points hypersensitive to cold I cauterised it without result. I then washed out antrum and found a thin flocculent starch-blue streak of mucus. He had complete relief for some weeks. On again washing out the antrum a small dense elastic and translucent mass about the size of a tabloid came away. There was again temporary relief. A year later, on washing out the antrum, a large creamy mass about the size of a grape was seen.

CASE 3.—A lady, aged about thirty-five, who had suffered from “hay fever” and asthma in the spring and autumn, consulted me. The left antrum contained pus. When opened I removed a long band of glue-like substance which proved to be streptococcal when examined.

CASE 4.—A lady, aged sixty, suffered from Raynaud’s disease in the feet and fingers and came to see me because her cheek was becoming occasionally as discoloured as her fingers during an attack. No nasal abnormality except in the colour of the mucous membrane, which was anæmic and faintly purple like that sometimes seen in asthmatics. Both antra were diseased.

CASES 5 and 6.—Two sisters who had been suffering for twelve and seven years respectively from neuralgia of the face and forehead in a very severe form with disturbances of sight. Nothing to suggest disease in the nose. Antra contained streaks of light yellow pus. Pus also in the frontal sinuses. Operation on both and cure.

Surgically, the nose is the best drained cavity in the body.

Physiologically, it is the carburetter of the most economical engine in the world, making an equable mixture of air and steam and providing a constant climate for the lungs. It cannot be but that the free passages of air through the nose is physiologically important for the nice working of the brain with which its circulation is connected. A consideration of the aprosexia caused by adenoids and the stupefaction caused by cold in the head will convince us that intellectual inhibition is in a proportional degree due to nasal catarrh. Put another way no one can have complete use of his brain if his nose is out of order. Now for chronic catarrh itself, with its mucous extravasation and leucocytosis, there is no cure (except in the advertising columns of the weekly illustrated papers), and there should be none, for it is invariably a symptom and not a cause. It is surprising how frequently it is caused and maintained by latent disease in the nasal accessory sinuses, and when it is borne in mind that the area and extent of these sinuses is almost equal in extent to the area of the respiratory portion of the nose, it will be evident that to examine the nose without examining these spaces is like pronouncing a house not to be on fire because there is no smoke in the hall.

From the experiences I have had with the six cases I have just mentioned, I may say that I consider no examination of the nose to be complete that does not include washing out the antra of Highmore on each side.

I have never found an empyema in the frontal sinus unaccompanied by one in the antrum of Highmore. I have noticed that the amount of pus washed out is, if anything, in inverse ratio to the amount of degenerative change in the cavity so washed. In cases where neuralgia continues after operation a skiagram of the roots of the teeth should be made. I have, in two or three instances, found that teeth passed as sound by dentists showed root abscess and absorbed bone when exposed to the X-rays.

In addition to the pallor, loss of energy, and the catarrhal diathesis generally, I would like to include another symptom. It is a loss of the "air-taste" (if I may so call it): a loss of sensation giving rise to an asthmatic symptom in the nose. A "dry and husky" feeling as one patient expressed it. This is caused by any disturbance of the function of the turbinal organ. To this is due the feeling and complaint of nasal obstruction in cases of atrophic rhinitis when the nose is only too patent owing to absorption of the turbinal organ. It comes on about seven years after injury of the inferior turbinal and I cannot too strongly protest against the

interference with, and the wholesale removal of, this important structure as is still practised, and even illustrated in the latest surgical text-books on rhinology.

Discussion.

Dr. J. S. FRASER asked Dr. Gogarty whether he meant that turbino-tomy is never to be performed? The great point of radical operation on the maxillary antrum is the removal of the anterior end of the inferior turbinal and the ventilation and free drainage of the cavity. Mr. Tilley has recorded several cases in which the radical operation failed till he removed a piece of the anterior end of the inferior turbinal. The speaker's experience coincided with that of Mr. Tilley and he had never seen rhinitis and pharyngitis sicca following a moderate removal of the inferior turbinal. He was not referring to cases in which the spokeshave had been used.

Dr. J. W. KILLEN agreed that removal of the inferior turbinal bone was unnecessary if the antro-nasal septum was cut away low enough to ensure efficient drainage.

Dr. WATSON WILLIAMS considered that the communication from Dr. Gogarty was of great value in directing attention to a group of nasal affections that had hitherto frequently escaped detection.

OTOGENIC PHARYNGEAL ABSCESS.

BY DAN MCKENZIE.

OTOGENIC pharyngeal abscess is a rarity. In 1906, Holmes, reporting a case which appeared later in the *Annals of Otology*, stated that he had been told by no fewer than 147 of his colleagues that they had never seen a case, and most otologists of the present day would, I imagine, reply very much to the same effect. For, although it is true that when knowledge of a new disease becomes general its rarity often disappears; still, in the present instance, as I hope to show later on, the probability is that with our modern methods of rapid diagnosis and early intervention, otogenic pharyngeal abscess must be rarer to-day than it used to be twenty or even ten years ago.

Before proceeding to discuss the types of otogenic pharyngeal abscess with which this paper deals, we must first of all clear the way by alluding to pharyngeal adenitis and gland abscess secondary to aural sepsis.

Everyone is acquainted with the retro-pharyngeal lymphatic nodes, but the occurrence of septic infection of these masses of gland-tissue in association with suppuration of the ear seems to have escaped general attention. Yet, in infants particularly, the

combination is by no means uncommon, and even in adults unilateral swelling of the posterior pharyngeal wall, probably adenitis which has not come to abscess, is not uncommon in suppuration of the middle ear. I have on several occasions remarked its presence after a mastoid operation, and Weil has reported a case in which the condition was confirmed by a *post-mortem*.

Septic adenitis in this situation, however, may plausibly be ascribed not to infection from the middle ear, but to infection from the nose or naso-pharynx. That is to say, the retro-pharyngeal adenitis and the otitis may be looked upon as independent of each other save in the sense that they both arise from one common cause. Nevertheless, it is, on the other hand, highly probable that the infection of the pharyngeal gland is sometimes transmitted to it from the middle-ear cavities, or at least from the Eustachian tube, since, as Golgi's researches and the clinical course of cancerous growths in the middle ear alike show, there is lymphatic connection between the middle ear and the lymph-nodes in the pharynx.

But pharyngeal abscess of this kind, if due to infection from the middle ear, is a metastatic infection, and what the present paper particularly deals with is the occurrence of pharyngeal abscess in obvious communication with the middle ear by pus tracks traceable with the naked eye.

In gathering together the material for this article I have to express my indebtedness to Dr. M. Guillemin, who has made this topic the subject of a *Thèse (de Nancy)*, published in 1913, and to Prof. Jacques, of Nancy, through whose personal kindness I was enabled to obtain a copy of Dr. Guillemin's thesis. In this work, forty-seven cases of otogenic pharyngeal abscess have been collected from the literature and from the Nancy clinic, and to that number I am able to add thirteen further cases, including two reported by Mr. A. Cheatle and one by myself.

PATHOGENESIS.

For many illuminating suggestions upon the pathogenesis of the condition I am to a great extent beholden to Dr. Guillemin, but I have also taken the liberty of handling the facts after my own fashion.

The first thought that strikes one after running over the narratives of the cases in the literature is surprise that this complication of middle-ear suppuration should be so rare as it undoubtedly is.

And then additional surprise is felt when we discover that what would seem *à priori* to be the most likely and direct route for the pus from the ear to follow, that, namely, through the petrous bone, is, in reality, selected much less frequently than an indirect route through one or other of a number of tortuous channels, natural and pathological, which we shall examine in detail later on.

In treating of the pathogenesis it must be remembered that the *post-mortem* evidence at our disposal is not too plentiful, and our conclusions, therefore, though highly probable, are not entirely dependable and will doubtless undergo modification and alteration as fresh facts come to light.

There are four different ways in which otogenic pharyngeal abscess may be produced. First of all, as we have already hinted, by direct extension of the purulent disease from the middle ear through the petrous bone to the pharynx; secondly, by the wandering of an extra-dural abscess of the middle cranial fossa to the tip of the petrous, and thence by the foramen lacerum anticum or otherwise to the extra-cranial inferior surface of that bone; thirdly, by the direct extension of purulent disease from the pneumatic cells in the tympano-mastoid osseous structure to the under surface of the occiput and thence to the pharynx in a manner we shall examine in detail later on; and fourthly, by the wandering of an extra-dural abscess of the posterior cranial fossa to the same sub-occipital region.

These four methods may be conveniently described in pairs, the first two together, since in both of them the pus reaches the pharynx from the region of the tip or under surface of the petrous bone—we may term this the *sub-petrous variety*—and the last two together, since in them the pus reaches the pharynx from the under surface of the occiput—the *sub-occipital variety*.

I. THE SUB-PETROUS VARIETY.

We begin with the first group, that in which the pus reaches the pharynx from the tip or under-surface of the petrous bone, and we shall describe, first of all, the direct route through the petrous bone itself, and secondly the indirect route by way of the floor of the middle cranial fossa.

The Direct Route from the Middle Ear through the Petrous Bone.—The apex of the petrous lies, of course, in close anatomical relationship with the pharynx. Near by is the orifice of the bony portion of the Eustachian tube, the walls of which may contain

aberrant air-cells in direct communication with the middle ear. Further, as Cheatele and Mouret have pointed out, the apex of the petrous may contain cellular extensions from the mastoid which pass between the cortex of the petrous and the upper limits of the labyrinth capsule—the supra-labyrinth cells—above the internal auditory meatus. And, again, cells may extend inwards from the floor of the tympanum between the labyrinth capsule and the jugular bulb—the sub-labyrinth cells—to the apex of the petrous below the internal auditory meatus and in relation to the carotid canal. Finally, a number of writers have drawn attention to the canal for the tensor tympani as a likely route by which pus may reach the pharynx.

The tensor tympani, it will be remembered, which is from 10 to 15 mm. in length, occupies a canal in the roof of the Eustachian tube and passes as far forward as the spine of the sphenoid and the adjacent part of the greater wing of that bone, so that pus following its fibres would certainly arrive at a position commanding an extension to the pharynx. Guillemin, however, is inclined to criticise this view. He points out that the muscle would be more likely to obstruct than to favour the propagation of the disease unless the infection is so virulent as to destroy its fibres. His criticism is supported by *a priori* reasoning. If this channel were a likely route one would expect pharyngeal abscess to be much more frequent than it is, since the canal is a constant structure. But, on the other hand, we have to record the fact that in a fatal case reported by Knapp the *post-mortem* findings showed that the pus did actually take this route to reach the pharynx.

Before leaving this division of the subject mention may be made of a curious case described by Haug in which a piece of cotton wool inserted into the ear by the patient himself led to the formation of a pharyngeal abscess. When the abscess was opened, through the mouth, the foreign body was recovered. Haug supposes that the patient had contrived to push the cotton wool through the floor of the tympanum, and that it then moved along towards the pharynx outside the Eustachian tube. But the simpler explanation that the plug had ulcerated its way through the walls of the tube is perhaps more acceptable.

Another possible route for the pus to follow is that by way of the carotid canal, the walls of which are occasionally occupied by pneumatic spaces, as we have already seen. A considerable number of cases are on record in which pus found its way into this channel with varying results, as we shall see.

Such, then, are the routes through the petrous by which pus from the middle ear may make its way to the apex or under surface

of the bone and so to the pharynx. But in spite of these numerous possibilities this (after the variety next to be described) is the rarest mode of production of a rare condition, and one naturally looks around for an explanation of this fact. I suppose it is to be found in the infrequency of aberrant air-cells in the petrous. At all events I can suggest no other explanation.

The Indirect Route from the Middle Ear by way of the Middle Cranial Fossa.—We now proceed to examine the methods by which extra-dural pus in the middle cranial fossa may find its way to the sub-petrous region. As is well known, extra-dural abscess of the middle fossa takes origin usually in the roof of the tympanum, aditus, or antrum—we exclude for the moment extra-dural abscess formed from petrous disease—and to reach the apex of the petrous bone it has to burrow downward, forward, and inward between the dura and the anterior surface of the pyramid.

Extra-dural abscess of the middle fossæ may also be formed locally at the apex of the petrous by disease of those occasional aberrant air-cells of the petrous which we discussed in the last section, as in the case described and depicted by Wilkinson. It is by these abscesses that the cranial nerve paralyses are produced, of which recent otological literature presents several interesting examples.

From this region we may suppose that in order to produce pharyngeal abscess the pus of an extra-dural collection must find its way out of the cranial cavity through the foramen lacerum anticum, or through the foramen ovale, or through a fistulous opening in the bone produced by the disease.

That pharyngeal abscess is so rarely induced by this particular method—there seems to be only one case on record, that of Auvert—need cause no surprise. To begin with, the dura mater is very closely adherent to the bone of the petrous pyramid, so that, unless the pus follows a pre-existing channel, like that of the superior petrosal sinus, its inward passage must be made with great difficulty. In the second place, even when it has reached the neighbourhood of the foramen lacerum anticum, its escape from the cranial cavity will be opposed by the firm adhesion of the dura to edges of the foramen and by the stout ligamentous union between the petrous and the sphenoid bones.

In this connection we must refer to an extraordinary case reported by Boyce Barrow. The patient was a woman, aged thirty-eight, with middle-ear suppuration, facial paralysis, and headache. A mastoid operation was performed without relief, and, after several interventions, dysphagia and dyspnoea appeared, and the patient

began to expectorate fetid pus. In spite of all efforts death took place. The autopsy showed an extra-dural abscess on the external aspect of the frontal lobe, pus from which was draining through a perforation in the cribriform plate of the ethmoid. The extra-dural abscess communicated with an abscess in the temporal lobe.

By whatsoever channel the pus reaches the under-surface of the petrous once it has got to this region it is already in close relationship with the lateral wall of the pharynx. Here it may present passing in above the upper border of the superior constrictor within the lateral pharyngeal fascia. Or, following the downward and inward direction of the levator palati muscle which is attached to the cartilaginous portion of the Eustachian tube, it points in the palate above the tonsil, very much in the position of the ordinary peritonsillar abscess. (That being so the appearance of a peritonsillar abscess in the course of a suppuration of the middle ear, particularly if the latter is acute, should lead to a careful investigation of the case in order to exclude any connection with the disease in the ear.)

In this neighbourhood the abscess and its surrounding zone of inflammation come into contact with the pterygoid muscles, particularly with the inner head of the internal pterygoid (Hessler's case with *post-mortem*), whereby, as we shall see in the next section, certain characteristic symptoms are produced.

Further, the proximity of the pus, both within and without the cranium, to the inferior maxillary division of the fifth nerve is responsible for neuralgic pains, and may also induce spasm or paralysis of the muscles of mastication.

We have seen that the cells by which the suppuration traverses the petrous sometimes border upon the carotid canal. In this way ulceration of the artery and fatal hæmorrhage may occur. Short of ulceration the records show that the carotid canal may become filled with granulations and pus to such an extent as to compress the artery, as in Grunert's case, to a fine tube, "the size of a knitting needle."

In Grunert's case the posterior wall of the carotid canal at the apex of the pyramid had become separated and was found lying loose in pus. There was a retro-pharyngeal abscess continuous with the original collection at the apex of the mastoid.

The mention of caries of the carotid canal leads us to draw attention to a case of pharyngeal abscess reported by Guisez, in which a sequestrum of the antero-inferior wall of the tympanum was found and removed. And here, also, we may appropriately

refer to those cases in which a fistulous opening has been observed in the anterior wall of the bony external auditory meatus communicating with the deep abscess. Cheatle has drawn attention to this circumstance, and similar cases have been reported by Kofler, v. d. Busch—quoted by Hessler—and others.

Three explanations may be suggested for this occurrence: first, that the abscess forming in the deep pterygoid and pharyngeal regions may erode the anterior bony wall of the external meatus; secondly, that, as Hessler, relying upon Huschke's findings, says, natural defects are common in the bone of the anterior meatal wall, and so the pus readily breaks through this wall; or thirdly, and most probably, pneumatic cells in the anterior meatal or adjoining tympanic or carotid walls which are participating in the production of the deep abscess, break down and thus form the fistula.

II. THE SUB-OCCIPITAL VARIETY.

We come now to discuss the modes of production of the second variety of otogenic pharyngeal abscess, that, namely, in which the pus collects in the sub-occipital region, whence it passes to reach the pharynx by a more or less circuitous route.

We must pause here to interpolate the remark that otogenic sub-occipital abscesses as a rule either remain limited to this region, pointing and discharging in the upper zone of the neck behind the sterno-mastoid, or else they gravitate directly downwards to open in the lower cervical region or, it may be, to extend to regions even more remote. The extension to the pharynx is exceptional. But for all that, the sub-occipital pharyngeal abscess seems to be commoner than the sub-petrous variety.

Following the plan adopted in the last section, we shall first of all examine the methods by which the sub-occipital abscess forms, and, secondly, the routes by which it may reach the pharynx.

As we have already seen, in this, as in the last variety, there are two sub-varieties: first, that in which the pus reaches the sub-occipital region directly from the bone-cells of the mastoid and of the occipital bone; and, secondly, that in which the pus reaches the sub-occipital region after traversing the posterior cranial fossa, usually as an extra-dural abscess.

The Direct Route from the Tympano-mastoid Spaces to the Sub-occipital Region.

We may define the sub-occipital region for the purposes of this paper as that part of the cervical region immediately below the occiput which lies posterior to

the styloid processes and rectus capitis lateralis muscle, medial to the inner aspect of the mastoid process, lateral to the margin of the foramen magnum and the occipital condyle, and anterior to the superior curved line of the occiput. (This definition brings the jugular foramen into the *sub-petrous* region, and so assumes that pus emerging from that opening will pass to the pharyngeal wall *direct* as in Variety I. Probably this is just how pus having this origin would behave if it escaped beyond the carotid sheath, but we shall allude to this point later.)

When pus from the middle ear and mastoid process finds its way directly to the sub-occipital region it does so in a manner that reminds us of the formation of Bezold's abscess. The infection, passing to pneumatic cells at the base of the skull, sets up osteitis and cario-necrosis of the cortical wall of the cell, eventuating in the formation of a fistula through which the pus finds its way into the soft tissues of the neck. In this case these soft tissues are the muscles of the nape of the neck which are attached to the occiput, together with their intermuscular fascial planes. In this sub-variety, we may remind the reader, *intra-cranial* disease is not one of the steps of the process.

The researches of Cheatle, Perez, Monret and others have shown that the cells which play the most important rôle in the production of sub-occipital, and so of pharyngeal, abscess is that occasional group which lies in the "digastric triangle,"—that is, in the bone between the mastoid process and the occipito-mastoid suture. These are known as the "sinuso-digastric cells." They communicate with the mastoid cells at a point on the inner wall of the mastoid process, midway between the vertical part of the lateral sinus, the posterior wall of the external meatus, the antrum and the mastoid apex—a spot which should always be carefully scrutinised in mastoid operations.

This group of cells may also extend across the suture and invade the occiput (Cheatle), where, in combination with an occasional extension of the sub-labyrinth group, they may lead to the jugular foramen being completely encircled with pneumatic bone.

When pus breaks out from these cells it finds itself, as we have already said, in the sub-occipital region.

The Indirect Route to the Sub-occipital Region.

So much for the direct or osseous route of infection of the sub-occipital tissues. We turn now to the group in which pus reaches the sub-occipital region after traversing the posterior cranial fossa as an *extra-dural abscess*.

In most of the case-reports it is assumed that the pus burrows down to the jugular foramen and finds its way to the exterior

through this opening, a route which would bring it at once to the pharyngeal region.

Guillemin, criticising this view, expresses surprise that in none of the cases, with the exception of that of Laurens, has any note been made of interference with the nerves in the jugular foramen. This circumstance, coupled with the consideration that the dura mater of the sinus channel is closely adherent all round the foramen, leads him to doubt whether the pus does pass out by the jugular opening as often as has been surmised. He suggests, as an alternative and more likely route, that the pus may emerge through the occipito-mastoid suture where it traverses the lateral wall of the jugular foramen, a direction which would, of course, bring it definitely into the *sub-occipital* region.

A septic clot within the lateral sinus and jugular vein may give rise to pharyngeal abscess. But this particular origin of the abscess, curiously enough, seems to be very rare, as only one or two cases are on record.

We have remarked above that from the jugular foramen pus would pass directly to the pharynx, seeing that the foramen opens anterior to the rectus capitis lateralis and the styloid process, but equally of course it would be contained—for a time at all events—within the carotid sheath, which is attached to the bone around the carotid canal and the foramen lacerum posticum. Probably, therefore, Guillemin's explanation is correct that pus in the sub-occipital region originating in a peri-sinus abscess gets out of the skull through some opening other than the jugular foramen. In addition to the occipito-mastoid suture it is obvious also that, like the mastoid emissary vein further up, the posterior condylar foramen may furnish an outlet for peri-sinus pus. This foramen, which lodges a vein, leads from the jugular bulb to the sub-occipital region.

Secondly, several authorities have suggested that an extra-dural abscess may pass out of the skull by the foramen magnum. But, as Guillemin points out, the close attachment of the dura to the margins of the opening, and anteriorly, the presence of the resistant occipito-atlantoid ligaments, must render its exit here a matter of great difficulty.

Thirdly, the anterior condylar foramen may conceivably provide an escape for an extra-dural abscess. This channel would, like the jugular foramen, bring the pus direct to the pharynx.

It is said that a small venous plexus, dependent upon the lateral sinus, accompanies the hypoglossal nerve in this canal, and if it becomes thrombosed may initiate pharyngeal abscess.

Instead, however, of following such pre-existing channels the pus of an extra-dural abscess sometimes destroys the bone to reach the deep cervical region. The base of the skull at the side of the foramen magnum, for example, is liable to such penetration, as it is thin to translucency, especially where it forms the roof of the horizontal posterior condylar foramen, an opening which also, as we have just seen, may furnish a vent to extra-dural abscess.

In one or other of these ways, then—either directly from a fistulous sinuso-digastric cell or indirectly from the draining of an extra-dural abscess—pus reaches the sub-occipital region and the intermuscular spaces between the deep posterior and lateral cervical muscles attached to the occiput.

As a consequence, deep-seated cervical cellulitis is set up, which in most cases, as we have said, remains confined to the posterior cervical region, coming to the surface or being opened up behind the sterno-mastoid, but which also sometimes gravitates towards the pharynx and reaches that cavity in spite of the muscular and fascial obstacles to its progress in that direction.

It remains for us now to trace the paths by which sub-occipital pus may get to the pharynx. This involves a consideration of the muscles and the fasciæ in the region.

The key to the position is the rectus capitis lateralis muscle and the stout layer of deep cervical fascia which lies in front of it, stretching across from the pre-vertebral to the deep parotid fascia. In front of the fascial layer is the carotid sheath with its vessels and nerves.

The rectus capitis lateralis is a small quadrilateral muscle, which runs from the transverse process of the atlas upward to the jugular process of the occipital bone. (Its surface landmark is the posterior wall of the external auditory meatus.) It thus stretches like a curtain across the space between atlas and occiput, and extends laterally from the styloid to the occipital condyle, so that it divides the region into an anterior and a posterior compartment. The former we have termed the sub-petrous and the latter the sub-occipital region. In the *sub-petrous* region in front of the barrier are the styloid process and its muscles, the carotid sheath, and the structures lateral to the pharynx. Behind the barrier in the *sub-occipital* region lie the insertions of the deep posterior and lateral cervical muscles, the posterior condylar foramen, the vertebral artery, and so on. And here the pus gathers from diseased sinuso-digastric cells and from wandering extra-dural abscesses of the posterior fossa.

From this region the pus tends to make its way out towards the surface, piloted generally by the occipital artery between the complexus and the splenius. The question we have to answer is, Why does it also sometimes get in front of the rectus lateralis so as to reach the pharynx.

Guillemin seems to hold that the pus may in some cases, under the influence of gravity, find its way between the medial border of the muscle and the occipital condyle, where only one layer of fascia is interposed. The route round the outer border, by the styloid process, is barred by three fascial layers—that of the rectus lateralis, of the deep parotid fascia, and of the carotid sheath—which here unite. Jacques supposes that in the cases where pharyngeal abscess forms, the fascial layers are weak or defective.

Without denying this, one may also suppose that when the fistula or the foramen of exit lies well behind the barrier, then the pus will be likely to remain limited to the posterior regions. Whereas, if it emerges close to the barrier, where the liquefacient action of the pus can act upon the fibres of the rectus lateralis and of its fascia, then it will tend to spread both towards the surface of the posterior cervical triangle and towards the pharynx.

Once the barrier is broken through, the pus reaches the subpetrous region and passes thence to the pharynx.

In most of the cases the infection is severe. The bone-disease is extensive, and multiple fistulous openings exist with general cellulitis of the whole region, in which circumstances, muscular and fascial conditions are negligible.

Among other developments which may manifest themselves we may mention the following: The pus may follow the stylo-pharyngeus muscle to the inferior pharyngeal regions. It may pass with the digastric to the floor of the mouth, or in deeper parts it may break into the occipito-atlantoid articulation.

SYMPTOMATOLOGY.

The most convenient way of describing the symptoms is first of all to take those which are caused by the local focus in the pharynx, and then, secondly, to allude to those due to the original lesion.

Symptoms caused by the Focus in the Pharynx.

In many of the cases the discovery of an abscess in the pharynx seems to have been accidental, and in a few the pharyngeal collection has been unsuspected until it was found at the autopsy.

In these cases either local symptoms were absent, we may suppose, or they passed unnoticed in the presence of other and more prominent clinical manifestations.

The usual symptom which leads to the examination of the throat is pain on swallowing, and, if we were to judge by the silence in the case-records, we should have to dismiss the local symptoms without any further remark.

In a case under my own care, however, the symptoms present were so characteristic and indicated the location of the phlegmonous lesion so precisely that I venture to say that they are the inevitable accompaniments of abscess in the deep pterygoid and pharyngeal region, and that they will be found, if looked for, more or less plainly marked, in all cases where reactionary phenomena are not entirely absent. No apology, therefore, is necessary for detailing them.

Pain was the first symptom complained of, appearing several weeks before the pharyngeal abscess was suspected, and affecting all the teeth in the upper and lower jaw of the left side. So severe was it that the patient, believing it to be toothache, had eleven teeth extracted. This obviously was caused by irritation of the fifth nerve.

Several weeks later the patient came into my hands and a radical mastoid and labyrinthotomy operation was performed. A fortnight later the "toothache" disappeared.

Six weeks after the operation pain was again experienced, but on this occasion it was localised in the left cheek and parotid region. It was deep-seated and agonising in character.

After a week of pain, œdema of the left temple, orbit, and cheek appeared, and rapidly became very considerable. Although it affected the soft parts above and below the zygoma, the œdema was less over that process of bone itself, the position of which was indicated by a shallow transverse linear hollow.

With the appearance of œdema came difficulty in mastication, from pain and stiffness on moving the jaw. On examination the mandible was found to be fixed in a half-open position, so that it could neither be opened fully nor closed, and attempts to do so caused pain.

Pain was also felt on swallowing, and on inspecting the throat marked swelling and redness of the left tonsillar region and of the left side of the pharynx were observed.

The general symptoms need not detain us. They were those of septicæmia.

Obviously nothing but a phlegmon situated in and limited to the depths of the pterygoid and lateral pharyngeal region could give rise to such a symptom-group.

The most important external signs were the distribution of the œdema and of the pain, and the fixation of the lower jaw in the half-open position. Closure of the jaw is effected by the masseters and by the internal pterygoid muscles. Difficulty in closing the jaw is also seen in furuncle of the anterior meatal wall, particularly where there is some associated inflammation of the parotid region. But in pharyngeal abscess furuncle can be excluded. Thus the difficulty in closing the jaw must have been due to mechanical interference with the action of the internal pterygoid.

Again, the jaw could not be fully opened. This symptom is found in simple peritonsillar abscess, but in that condition the mouth can be closed.

Perhaps, also, mechanical interference with the moving of the condyle of the jaw and of the ramus played some part in the causation of this symptom.

These are the symptoms produced by the focus in the pharynx, and we proceed now to discuss the clinical picture produced by the original lesions—excluding, of course, those referable directly to the ear.

Symptoms of the Sub-petrous Type.

Direct Type.—The symptoms which appear in this type need not be detailed as they are, of course, those of complications of middle-ear suppuration due to extension of the disease into aberrant pneumatic spaces in the petrous. Thus the condition may be entirely latent or we may have the signs of purulent labyrinthitis, of facial paralysis (as in my case quoted above) or of extra-dural abscess at the tip of the petrous affecting the cranial nerves in this neighbourhood—the third, fourth, fifth and sixth.

Indirect (or Extra-dural) Type.—Extra-dural abscess may, of course, be entirely latent, and in that case the appearances of the pharyngeal complication would be unaccompanied by any other clinical signs, except those in the ear-spaces.

Otherwise, the presence of headache or paralyses, or irritation of the cranial nerves exist.

It must be remembered, however, that the picture we have just drawn is that of direct otogenic pharyngeal abscess in its early stages.

As might be expected, the subsequent progress of events effects considerable alteration in the aspect of the case if the abscess remains unopened. To begin with, the lapse of time leads to an increase in size of the pharyngeal tumour, with the result that difficulty in breathing, sometimes very grave, may be added to the dysphagia. Further, the collection of pus tends to gravitate also down the neck. It is said that there is little or no possibility of abscess in the posterior pharyngeal wall sinking below the cricoid since the pharyngeal aponeurosis merges into the œsophageal wall at this point (E. Urbantschitsch). But with regard to lateral pharyngeal abscess, the reports show that gravitation of the pus in the deep planes of the neck does undoubtedly occur, in which case, of course, the usual signs of deep cervical cellulitis make their appearance.

With these local symptoms in the severer cases appear the signs of grave septicæmia or pyæmia.

If still untreated there is the risk of the deep cervical abscess finding its way into the thorax and causing death from mediastinitis and general sepsis.

But in a large number, perhaps the majority, of cases the condition relieves itself by the spontaneous breaking of the pharyngeal abscess into the pharynx. And experience has shown that, apart from such untoward and uncommon happenings as asphyxia or aspiration pneumonia from a sudden gush of pus into the trachea, the discharge of pus into the pharynx is the natural method of cure in these cases.

Symptoms of the Sub-occipital Type.

Apart from the local pharyngeal signs and symptoms, the appearance presented by this type differs markedly from those of the sub-petrous type.

The most prominent phenomena are those of cellulitis of the posterior cervical triangle.

A typical case constructed from the records will be described, it being understood that departures from type are frequent, and moreover, that the picture may be modified by the presence of complications, of which the most frequent is lateral sinus thrombosis. We shall omit the symptoms of extra-dural abscess.

In the course of an acute suppuration of the middle ear, or of an acute exacerbation of a chronic suppuration, especially if there has been some delay in opening and draining the mastoid, the

signs and symptoms appear of cervical cellulitis in the upper region of the posterior triangle.

There is pain, especially on moving the head—torticollis is usually very evident. In the early stages swelling, with œdema, and tenderness on deep pressure over the neck close to the skull appear, and the whole area manifests a tough, brawny induration. These inflammatory phenomena tend to spread down the neck, and in some cases have reached as far as the clavicle before the pus close to the skull had got to the surface. Along with the local phenomena we find the usual signs of severe toxæmia.

This leads to operation. Incisions are made in the upper part of the neck and deepened until pus appears, which, as in Guillemin's and Jacques' case, may be seen to be oozing from the bone of the base of the skull.

At the same time, or earlier, the mastoid is opened and drained.

The drainage, however, does not remove the general symptoms. More or less pain, fever, and toxæmia continue, and further explorations in the neck or ear may be undertaken, but again without any decided or continued relief.

About this period discomfort on swallowing begins to attract the patient's attention, and if the pharynx be examined pharyngeal redness and swelling of the lateral wall or supra-tonsillar region will be observed.

The further course of the case corresponds with that just described in the last section.

In the literature I have not yet come across a case in which the definite signs of the deep pterygoid abscess were noted and described. This may be due to one of two causes. First of all, the special symptoms may have been overlooked, or, secondly, a sub-occipital abscess passing round the medial border of the rectus lateralis, situated as it would be some little distance from the pterygoid region, may not set up these special phenomena.

The course of the illness, in both types of the disease, as may be gathered from the foregoing account of its developments, is usually tedious and prolonged, but it is continuous. Intermissions and temporary halts do not seem to occur. The average duration of the cases is from one to two months.

DIAGNOSIS.

Lateral or retro-pharyngeal abscess from strictly local causes is not an uncommon condition. What is important is that we

should be able to recognise the fact that it proceeds from the ear when it does so. At times this will be impossible, and at other times the real state of matters will escape notice. The combination of ear discharge with the pharyngeal abscess should awaken suspicion, and this will be strengthened if temporal or facial œdema, fixation of the jaw, or cervical cellulitis is present. The importance of detecting the true nature of the case lies in the fact that a radical mastoid operation would be called for, if it had not already been performed.

PROGNOSIS.

The prognosis of the otitic complications which lead to pharyngeal abscess is serious, until the pharyngeal abscess forms and breaks or is opened. Then a lightening in the symptoms takes place with surprising rapidity, the flow of pus from the ear and from the cervical wounds lessens and stops; the infiltration and cellulitis diminish; the pain and constitutional symptoms subside and disappear, and the patient gets well.

The reason for this welcome transformation lies in the fact that the pharyngeal extension is generally the most dependent pocket of a diffused and widespread abscess, so that once it is opened efficient and continuous drainage of the whole region is effected. So strikingly is this exemplified in the records that Guillemin has suggested that in severe sub-occipital cellulitis the surgeon himself should, by breaking through the barrier of the rectus lateralis with a blunt instrument, offer this line of escape to the inflammatory products.

Naturally the prognosis is less favourable if the other complications are dangerous.

These considerations render fallacious any argument we might base upon case-mortality.

TREATMENT.

Prevention.—In the sub-occipital variety most of the case-narratives show operation on the initial mastoid suppuration to have been delayed, for one reason or another. Thus, the best method of preventing the cervical cellulitis and other complications of which the pharyngeal abscess is merely an expression, is to open up mastoid cells as soon as mastoiditis is diagnosed. This, of course, is nowadays the general practice. Consequently I have expressed the opinion that these complications of suppurative otitis are probably rarer to-day than formerly.

This remark does not apply with the same force to the sub-petrous variety, in which the extension of the suppuration to the pharynx is an early event in the evolution of the case.

Curative : Sub-petrous Variety.—If diagnosed early the treatment I employed in the case already mentioned may be adopted. An opening is made with a gouge in the anterior bony wall of the external auditory meatus, so as to form a window close to the tympanum, and deep to the temporo-mandibular articulation. This leads to the sub-petrous abscess. After the pus has been evacuated the abscess cavity is lightly packed through the artificial opening, and the patient is kept lying on his back, so as to encourage drainage. The mastoid wound is left open and the packing is removed and replaced daily by this route. In my case complete recovery followed in ten days.

This method is recommended in early cases, that is to say before the bulging in the pharynx has attained to such dimensions and prominence as will enable it to be easily and safely opened through the mouth. But if the pharyngeal wall is prominently bulging the experience which has been gained in the treatment of the sub-occipital variety shows that, in spite of the very natural *à priori* objections to opening an abscess due to bone disease in the pharynx, this route of access and of relief is not only quite safe but is also curative of the original disease upon which the pus-formation depends. We may, therefore, safely recommend it in the treatment of this particular variety also.

The older surgeons have been at pains to open these abscesses from the outside of the neck by an incision through the skin in front of or behind the sterno-mastoid. But unless there is extensive or progressing cervical cellulitis an external incision is unnecessary. Should widespread cervical cellulitis be present, however, especially if it has reached a level lower than the angle of the jaw, then undoubtedly most surgeons would consider an external incision not only justifiable but imperative.

The opening of the abscess through the mouth presents no difficulties whether it is situated on the lateral or on the posterior wall of the pharynx. The plan followed in opening simple peritonsillar abscesses is applicable also to the otogenic variety. A small incision is made through the mucous membrane. Through the incision the closed blades of a pair of dressing-forceps are inserted into the abscess cavity, opened widely and withdrawn open.

Care should be taken to keep the opening patent until the abscess is healed.

Sub-occipital Variety.—The best method of attacking the cervical cellulitis after the mastoid cells and their extensions have been opened up, is to detach the sterno-mastoid muscle, to remove the apex of the mastoid process, and to work our way inwards close to the bone of the digastric fossa and the jugular process of the occiput, so as to provide free exit for the pus in this region. This dissection may necessitate the division and ligature of the occipital artery. Additional incisions of relief at lower levels in the neck will be called for when the circumstances demand them.

With regard to the pharyngeal abscess, it should be opened through the mouth in the manner already described.

APPENDIX.

Guillemin's Cases:

His own	2
Collected	45

My Cases:

Tollens, 1; Grunert, 1; Haug, 1; Kofler, 1; Kreiss, 4;	47
Cheatle, 2; Hessler, 1; McKenzie, 1; Gatscher 1	13
Total	60

Deaths, 12 out of 59. (In several of the cases the pharyngeal abscess seems to have been overlooked until the *post-mortem* examination.)

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SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE.—OTOLOGICAL SECTION.

May 15, 1914.

MR. RICHARD LAKE, *President, in the Chair.*

Hyperostosis of Skull and Exostosis of the Right Auditory Meatus.—E. A. Peters.—Male, aged thirty-two, gardener; has a brother affected somewhat similarly. The supra-orbital and temporal ridges are prominently developed as in the case of the gorilla. The superior occipital ridge is also marked; there are hyperostoses of the nasal bones and also of the lower jaw anterior to the masseters. The right meatus is occupied by two exostoses growing from the anterior wall, while the left meatus is much contracted.

Dr. PETERS said it was a question whether it would be advisable to remove the exostosis on one side, or to open the meatus on the other side. The skin lining the meatus swelled from time to time, causing catarrh, thickening of the drum, and deafness.

Dr. URBAN PRITCHARD said it was an unusual case of exostosis; he had never seen one like it. Guessing at the pathology from other exostoses he had seen, he considered the exostoses were of cancellous bone, not ivory exostosis, and that therefore they were favourable for removal. He would remove them on one side and see what the result was. The inflamed skin added to the degree of blocking.

Dr. FITZGERALD POWELL said it was difficult to determine whether a similar condition existed in the middle ear. He did not regard it as a case for operation and counselled leaving it alone. In suppuration of the middle ear he did not think it justifiable to operate on these exostoses with a broad base. In the presence of suppuration it was far better to do a mastoid operation. These operations on broad-based exostoses were liable to set up suppuration where none previously existed, and it was very difficult to prevent occlusion of the external meatus after the operation. In the exostosis with pedicle it was, of course, quite different.

Mr. WHALE considered that the condition was a further stage of the state of affairs described by Alexis Thomson, in which there were exostosis on both sides of the skull following the distribution of the third division of the fifth nerve. In this case the bony growths occupied the areas supplied by all three divisions of the fifth nerve, and also the great and lesser occipital nerves.

Mr. C. E. WEST considered that the question of operation on these conditions of bony obstruction in the external auditory meatus was worth discussing further, as it was a pity to turn aside from the chance of benefitting a patient through fear that there might be bony growths in the tympanum which could not be seen or examined. In treating these cases, he preferred to work through the meatus whenever that route afforded reasonably good access. In the pedunculated forms it was easy to work through the meatus, and even ivory exostoses could be removed

without damaging the ear. Where there were broad-based exostoses, he thought the lumen could be satisfactorily restored by reflecting the pinna forward, and treating the posterior wall of the meatus to within 2 or 3 mm. of the attachment of the membrane, as if one were doing a radical mastoid operation, finally doing a plastic operation on the cartilaginous part, and turning the flap into the new cavity, which was not communicating with the middle ear, but was a shallow excavation in the mastoid adjacent to it. His experience had been satisfactory, even with most unpromising cases. If there was discharge, one might be able to restore the patient to safety and cure without interference with the tympanum; and in cases in which there was no discharge one might get brilliant results in reference to restoration of hearing. He would like to know whether anyone would refuse to give a patient a chance of return of hearing power by dealing with an exostosis which completely blocked the meatus, so that there was no opportunity of testing whether the patient could hear well with the meatus open.

Mr. HUGH JONES said that in exostoses of the non-pedunculated type there was always a danger that the condition extended beyond the external auditory meatus. The hearing of these cases was sometimes very bad even after free removal of the growths. In a case of his own, a medical man with attached ear lobules and a strong family history of otosclerosis, he removed the exostoses freely from both ears. One ear was operated upon on account of suppuration, the other at the urgent request of the patient. In both ears the hearing has, if anything, got worse. In Dr. Peters's case there was also marked absence of lobules, and the general hyperostosis of the skull might be another stigma of degeneracy.

Dr. PETERS, in reply, said he believed the patient's brother had a similar condition. General hyperostosis of the skull was different from the condition in the cases described by Alexis Thomson. In operating on meatal exostoses, except for middle-ear suppuration, it was essential to be certain that the patient could hear fairly well, and so exclude deeper trouble from exostoses. And it was wise to allow for the possibility of trouble due to thickening of the lining membrane, which varied a great deal.

Method of dealing with Auditory Meatus to secure Easy Application of Drainage-tube and Inspection of the Cavity.—E. A. Peters.—F. L.—, aged six. April, 1913: Subacute otitis media of left with post-auricular œdema; pertussis. Wild's incision relieved symptoms, but discharge from the meatus still continued.

March 24, 1914: Mastoidectomy and primary grafting. Instead of the formation of a flap, one blade of a pressure forceps was inserted from behind into the meatus sleeve as far as the crus helix, and the forceps closed so as not to include the post-auricular skin between the blades. The tissue gripped by the forceps was dissected out, and each margin of the groove so formed was attached by a catgut ligature to the periosteum. The packing was removed in three days, and a large drainage-tube inserted. By this method the part of the external meatus left falls into a natural position, and the mass of thickened tissue at the base of the crus helix, which often fills up a small excavation, is removed.

Dr. H. J. DAVIS said he considered that the result was admirable, but he did not understand precisely what Dr. Peters did.

Dr. PETERS replied that the pinna was drawn forward by a bivalve retractor, and that exposed the sleeve of fibro-cartilaginous meatus, and

through that sleeve one blade of the angular forceps was passed so far as the crus helix, then the blades were closed, and the portion nipped between them dissected out. The corners should be packed out or sutured to the periosteum. The tissue then cicatrised to either side of the groove, and there was no contraction of the aperture after the operation. The posterior part of the cavity was, by this method, very easily observed and dressed. The drainage-tube, instead of projecting vertically, was horizontal, and was caught by the tragus.

Primary Tuberculosis of the Ear.—**W. Jobson Horne.**—The diagnosis of the disease was definitely established by tubercle bacilli being found in the tissues over the necrosed portion of the temporal bone which is exhibited. On admission to hospital it was stated that the patient, a child, aged thirteen months, had been wasting for seven months, had had measles two months previously, and a cough of three months' duration. A discharge had been noticed from the right ear for about four months, and the left ear had also been affected. No mention was made of hæmorrhage from the ear. Fifteen days before death facial paralysis developed, and the child died with signs of cerebral disease. The *post-mortem* examination of the temporal bone showed that the membrana tympani had been destroyed by disease, the ossicles had perished, and the middle ear was disorganised. In the recent state the antrum as well as the middle ear was filled with *débris* and caseous matter. The cancellous portion of the mastoid was involved. The soft parts covering the outer surface of the temporal bone had been deflected. Immediately above and behind the external auditory meatus there was a sub-periosteal abscess. At the site of the abscess there is to be seen a sharply defined area of necrosed bone of about the size of a sixpence, and corresponding to the outer wall of the antrum. The external evidence of implication of this portion of the bone was insignificant of the degree of necrosis. Upon reflecting the dura mater from the cranial surface of bone an extradural abscess was found, together with some tuberculous deposits. Tubercle bacilli were found in sections cut from the soft parts covering the area of necrosis. The *post-mortem* examination further revealed extensive disease of the lymphatic glands, general miliary tuberculosis, tuberculous meningitis, together with tuberculous nodules in the brain. The lymphatic glands enlarged on the right side were the pre-auricular, the sub-maxillary, the supra-clavicular, and the deep cervical; and on the left side, those under the angle of the jaw to a less degree. The tracheal and bronchial glands were very large and infiltrated, and some of these were liquid in the centre; the mesenteric and the glands in the hilum of the liver were also tuberculous. The brain contained three tuberculous masses of the size of small marbles, which were situated (1) in the lateral ventricle on the left side in the posterior and internal part of the optic thalamus; (2) in the posterior lateral parts of the right lateral lobe of the cerebellum; (3) in the posterior lateral part of the left lateral lobe of the cerebellum. There was little thickening of the pia and arachnoid membranes at the base, but well-defined tubercles could be seen along the Sylvian fissures, and on the lateral aspect of the convolutions above the corpus callosum. The thoracic and abdominal viscera show general miliary tuberculosis. The case and specimen illustrated points raised by the exhibitor in the discussion on some cases shown at the previous meeting.¹ Primary tuberculosis of the ear, in the

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxix, p. 584.

opinion of the exhibitor, presents such definite clinical and pathological features that it can be easily distinguished from the secondary form of the disease. These features were well brought out in the present case. Primary tuberculosis of the ear is essentially a disease of childhood, if not of infant life. Primary tuberculosis of the ear in the adult, in the experience of the exhibitor, is an unknown disease. When the cases in which the diagnosis has been definitely established are considered alone it will be found that the frequency of the disease both in early and adult life has been considerably overstated. The specimen further illustrated the exhibitor's contention that in the primary form the stress of the disease in the first instance is upon the mastoid bone.

Mr. C. E. WEST, discussing the use of the word "primary" by Dr. Horne in this case, said he thought it should only be applied to the first macroscopic development of tubercle in the body in any particular case. Bone tubercle was very rarely primary in that sense; it was generally preceded by some focus, generally already caseating in lymphatic glands. All would agree that this class of case was not met with in adults; when tuberculosis of the ear was encountered in adults it was nearly always a complication of phthisis, probably conveyed, not as in this case, by the blood stream, but along the lymphatics in the submucosa from the pharynx. With regard to the operative results in cases of tubercle of the temporal bone in children, he would like to hear of any collected results. His own experience had not been large, but he agreed with the exhibitor that provable tubercle of the temporal bone in children was rarer than one would expect from the statements made. He believed that only a small proportion of the cases suspected as being tubercular could be demonstrated to be tubercular, either by staining methods or by injecting into guinea-pigs. He asked also whether anyone could say in what proportion the tubercle bacillus was the bovine form and in what number it was the human form. In his experience, the immediate results of operation in these cases had been mostly good—*i. e.* in about 75 per cent., but in three or four years, after the ear had apparently been sound again, 50 per cent. of the recovered cases died of tuberculous meningitis or generalised tuberculosis.

Mr. MOLE said he had a case which looked as if it would end in the same way as the present one of Dr. Horne's. The patient was only a few months old, and the symptom was a mastoid abscess; clinically there was no sign of tuberculosis. He cleared it out, doing a fairly complete mastoid operation. Five weeks later definite facial paralysis developed, but examination of the chest suggested tuberculosis of the lungs, so no further operation was done. One of the infant's parents had died of tuberculosis and the other was dying from the same affection.

Dr. DAN MCKENZIE asked whether any member had experience of the action of tuberculin in tuberculosis of the temporal bone. He was aware of the difficulty in saying that a disease of the temporal bone, in the living patient, was tuberculosis, as the diagnosis could only be definitely settled by animal experiment or by the *post-mortem* examination. He had had experience of one or two cases of suspected tuberculosis of the middle ear in children (he agreed that such cases were rare), and in those two cases, he found considerable benefit from the action of tuberculin. But as he could not claim that they were genuine cases of the disease, he expressed that opinion with the utmost reserve.

Mr. WHALE asked whether Dr. Horne did an operation in this case. If not, he did not know how Dr. Horne supported his contention that in the primary form the stress of the disease, in the first instance, was upon

the mastoid bone. In the second paragraph the statement was made that the membrana tympani, the ossicles and the middle ear was destroyed. The primary stress might have been in the middle ear unless an operation had given evidence of the previous condition during life.

Mr. HUGH JONES said he had experience of tuberculin in the case of twins who were proved, by bacteriological examination and by inoculation of guinea-pigs, to have primary tuberculosis of the ear or mastoid. Bacilli were found in the milk, and the source of the milk was traced to a tuberculous cow. The children were three months old when the disease began—suppurative otitis and accompanying mastoid trouble. Tuberculin was given under the direction of Dr. Nathan Raw, after radical mastoid operations had been performed, but in the opinion of the medical man attending the cases, and himself, had no effect and was very soon discontinued. Both babies made excellent recoveries, though one of them had to be operated on three times for cervical glands. There was no family history of tuberculosis.

Mr. MARRIAGE said he would like to hear more about the experience of other aurists concerning the use of tuberculin in these cases. Five years ago he had two patients, aged respectively four and seven months. In both cases there were polypi in the tympanum, which showed active tuberculosis. He performed a radical mastoid operation and used tuberculin in each case, but did not feel at all sure that the tuberculin had had any effect: at any rate, it did not prevent caseating glands on both sides of the neck. The glands were subsequently removed and both children were now quite healthy and their ears perfectly healed. He had at present under his care another child, aged two, who had had polypi in the tympanum in which active tuberculosis was found, and he was hesitating whether to use tuberculin in addition to an operation.

Dr. JOBSON HORNE replied that the question raised as to the definition of primary and secondary tuberculosis was a larger subject than the Section could discuss at that time. With regard to operating on these cases one had to be guided by the condition of the child. In this particular case the child was moribund when admitted to hospital. In doubtful cases of tuberculosis of the mastoid bone, he favoured an exploratory operation to ascertain the condition of the mastoid, and if evidence of bone disease were found, to proceed accordingly. As to the stress of the disease being upon the mastoid bone, if one examined the specimens of primary tuberculosis of the ear, it would be found that the amount of the bone disease and the necrosis of the mastoid was out of proportion to and in advance of the disease in the middle ear itself.

Stenosis of External Auditory Meatus; (?) Result of Middle-ear Suppuration.—Dan McKenzie.—The patient is a woman, aged thirty-two, who came to hospital complaining of deafness. There is a history of old suppuration in both ears, and the right still shows traces of that disease. The external auditory meatus on the left side is completely stenosed, the canal ending in a *cul-de-sac* lined with epidermis. On catheterizing the left Eustachian tube air can be heard to enter the tube and perhaps also the middle ear. It is supposed that the stenosis is the consequence of an attack of middle-ear suppuration which the patient experienced in childhood. X-ray plates showed the difference in the bony meatus of the left side compared with the right: but according to the exhibitor's interpretation of the left image the meatus and middle ear are not entirely occupied by bone. He therefore proposes to reflect

forward the auricle and to reconstitute the external meatus. Opinions regarding the advisability of such an operation are welcomed.

Dr. H. J. DAVIS said he thought it was a congenital occlusion of the meatus, and the case seemed similar to the one (a boy) he had shown.¹

Mr. MOLLISON said that two days ago he saw a precisely similar case, in a small child. The mother was quite certain there had been discharge from both ears for two years; but that from the left had stopped. The left meatus ended blindly, and on feeling with the probe the obstruction seemed to be a bony blockage, not membranous. He suggested that the present case was bony occlusion of the meatus, and that the pathology was similar to those cases of occlusion of the cavity after the radical mastoid operation.

Dr. FITZGERALD POWELL said there were no notes as to the hearing, and the woman positively said she had had suppuration. If this was so, it was a case for operation, but if not it was of no use to operate, as probably there was no middle ear.

Mr. CYRIL HORSFORD said he did not think the treatment ought to be much influenced by whether the condition was congenital or not. At the present time a child under his care had got an imperforate meatus on both sides. On one side there was a sinus or fistula, which was perforated below the tragus; it did not burst through at the original meatus. Because there was suppuration and fairly good hearing, he operated (radical mastoid), and the hearing was now good. The meatus was found to be fairly normal. He suggested operation in this case, because he thought the meatus would be found to be free behind, especially as Dr. McKenzie said he could hear air passing when catheterising.

Dr. DUNDAS GRANT said he thought the term "atresia" was more applicable to this case than "stenosis." He had a case which resembled this, a complete diaphragm having been formed external to the tympanic membrane as the result of the entrance of the caustic drops into the ear. The patient was extremely deaf, but under the use of the Eustachian catheter the hearing improved so much that he thought it best to do nothing further in the way of removal of the diaphragm. He thought the result in Dr. McKenzie's case was due to suppuration, and he did not regard such cases as promising ones for operation.

Dr. DAN MCKENZIE replied that he agreed that the history of the case suggested suppuration, rather than congenital closure. He thought the woman should be given the chance of an operation, though one would probably find the ear spaces filled up with bone. It was true he could hear air when using the Eustachian catheter, but it seemed a long way off. If he operated, his intention was to make for the antrum and to get into the middle ear from there, unless there already was a lumen on the other side of the diaphragm, which he doubted.

Congenital Deformity of Left Tragus and Corresponding Half of the Face.—**Dan McKenzie.**—A girl, aged sixteen. The tragus is represented by an auricular cartilaginous mass. The facial deformity is quite obvious. It affects the bony skeleton, including the hard palate, the superior maxilla and the malar bone. The left palpebral fissure is distinctly small and the left globe appears to be on a higher level than the right. The recent onset of some orbital œdema and the girl's story that the malar bone and zygoma were becoming more prominent, aroused

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxxi, p. 315.

suspicious of the existence of a neoplasm. But the X-ray plates (exhibited) show no signs of new growth, and the girl's former photographs (also exhibited) clearly show that the deformity has been in existence for many years. He proposed to remove the pre-auricular cartilaginous mass.

Double Multiple Exostoses.—**H. J. Davis.**—The patient is a male, aged forty-seven, who for some months before my seeing him last January had noticed that his hearing was less acute than it used to be. He was unable to hear witnesses' answers in court, and as he was slowly getting worse he saw his medical adviser, who sent him to me. It will be noticed that there are ring-shaped pedunculated exostoses in both ears, and the appearance on the right side is peculiar. All the high forks are well heard, but not the low (C_{32} , C_{64}), and the question arises as to whether operation would improve his hearing or not. I am inclined to believe that it would make very little difference, as in all probability the same condition obtains inside the tympanum as outside. The patient has periodical vaso-motor rhinitis, and he is "gouty," a condition often noted in these cases. Tuning-fork tests: Weber central, Rinne + and not —, as one would expect. The only treatment he has had (and hearing has undoubtedly improved) is phosphorus $\frac{1}{100}$ gr. *ter die*, and this he has been taking regularly up to date. There is periodical tinnitus on left side and no improvement on inflation.

The PRESIDENT did not see any reason why an operation should not be done on the right side. The little exostoses were growing from the squamous portion of the temporal bone, where the tympanic ring was incomplete.

Mr. MARK HOVELL said his feeling about the case was that the exostoses should not be touched, but the treatment should be confined to the middle ear.

Dr. H. J. DAVIS replied that he did not think any operative treatment would make much difference to the patient's hearing powers. The patient had got it well into his mind that there was an obstruction in the canal of the ear, and that this, if removed, would naturally benefit the hearing.

Bilateral Temporo-sphenoidal Abscess in a girl, aged sixteen; Operations; Recovery.—**H. J. Davis.**—At the meeting of the Section in May, 1913, this patient, a girl, aged sixteen, was exhibited after recovery from an operation for temporo-sphenoidal abscess on the right side following mastoid disease and aural polypus.¹ In February, 1914, she again presented herself with similar symptoms referable to the *left* side: Earache, vomiting, and vertigo—an aural polypus was protruding from the meatus. An operation had to be performed on February 10, before I saw the case; the mastoid had been explored, but the antrum was unopened. On February 14, as the patient had developed facial paralysis and looked extremely ill, I made a wider incision and opened and drained an extradural abscess. The bone was dense and showed no trace of cells and the mastoid antrum was found to be a mere linear slit as, I remembered, had been the case on the opposite side. The bridge was removed and the posterior auricular wound left open and lightly packed. The temperature was 103° F. before operation and it dropped to 100° F. The brain over the exposed area pulsated freely, and I therefore did not explore the lobe. Three days later my colleague was asked to see the patient as she had become restless, aphasic, and rapidly unconscious. I found her rolling and flinging herself about the bed with rotatory nystagmus to

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxviii, p. 539.

the right and with signs of meningitis. A large temporo-sphenoidal abscess was opened and drained. The brain on exposure was motionless, and on incision pus and a quantity of sanious fluid streamed from the lobe, which immediately commenced to pulsate. Continuous salines were administered and a lumbar puncture performed. The pathological report next day was to the effect that "pus was present in the cerebro-spinal fluid," and the prognosis was therefore looked upon as hopeless. My colleagues, Dr. Bernstein and Dr. Elworthy, who also saw the case, recommended intra-spinal injections of anti-streptococcus serum, 10 c.c., and this was given twice with twenty-four hours' interval. She also had three vaccine injections in the flank and was kept alive on champagne, pituitrin, and other stimulants, and she slowly made an uninterrupted recovery. She is now bright and alert, and the aphasia has disappeared. She hears no fork except on contact. There are several points about the case which have induced me to exhibit her again before the Section:—(1) The remarkable symmetry of the disease on each side: Mastoiditis with no swelling, aural polypus, extremely dense mastoids with antra so small as to be almost unobservable, facial paresis, great pain, vertigo and rotatory nystagmus to the opposite sides. (2) The fact that a patient has had an abscess on each side of the brain within twelve months and recovered. (3) The fact that there was purulent spinal meningitis, as evidenced by pus and streptococci in the cerebro-spinal fluid, and yet the patient recovered. In my opinion this was due to the intra-spinal injections of antistreptococcus serum, and clinically, this is most important. (4) The fact that women seem to be more tolerant to cranial interference than men. I do not think that a man could possibly have gone through all that this girl experienced and recovered. In my experience, in intra-cranial complications following mastoid disease, men appear to be much more vulnerable than women. Perhaps this is due to a higher cerebral organisation, although it may not do to say so. (5) Drainage: After the first forty-eight hours the cerebral abscess cavities were drained with cyanide gauze alone, and the tubes removed; the advantages of gauze drainage were first pointed out to me by my colleague, Mr. Donald Armour, and I have been much indebted to him for this hint. (6) The patient was aphasic for a fortnight (on the second occasion); she could speak, but called objects by the wrong names: a small celluloid duck she was shown she said was "an elephant," a pencil she called "a stool," and so on.

Notes by Dr. Elworthy.—The investigations conducted on material from this case were as follows: (1) An examination of cerebro-spinal fluid (the inquiry being for the absence or the presence of pus). Pus was present in an amount sufficient to form a very obvious deposit after standing a short time, the supernatant fluid remaining opalescent. The cells present were, with few exceptions, polymorphonuclears, the organism a short-chained streptococcus (not a pneumococcus). Unfortunately the reaction of the fluid was not taken. (2) An examination of cerebro-spinal fluid on February 21, 1914. The findings were as follows: Reaction alkaline; albumen abundant, but a small amount of blood was present. The nucleated cells amounted to 45 per cent.; of these 90 per cent. were lymphocytes and 10 per cent. were polymorphonuclears. Streptococci were neither seen in the films nor grown in culture. (3) March 3, 1914: An endeavour was made to recover the streptococcus from pus obtained from the wound for the purpose of vaccine preparation, but *Staphylococcus aureus* and *Staphylococcus albus*, diphtheroid and coliform bacilli alone were found.

Dr. H. J. DAVIS did not think anything in the method of drainage of the abscess had had very much to do with the patient's recovery when she was at the point of death. He thought the intra-spinal injections of serum had been invaluable in this respect.

Anatomical Preparations of the Temporal Bone, in situ.—G. J. Jenkins.—Mr. Jenkins showed the bases of three skulls in which the temporal bones had been dissected from the middle and posterior fossæ. These dissections showed the relation of the middle-ear tract and external auditory meatus to the middle fossa. The labyrinth was shown in some cases with its dense capsule intact—the diploetic bone removed—and he held that the thickness of the capsule of the vestibular element was not sufficiently appreciated, as in most dissections he had seen this dense bone had been largely removed. In these specimens the relation of the seventh cranial nerve, geniculate ganglion, carotid artery, lateral sinus, and other soft parts could be demonstrated. In other dissections half the wall of each of the semicircular canals had been removed to show the relation of the canals to one another on the same and opposite sides. He pointed out as important features that the canal did not lie in a single plane, but was twisted on itself to lie in multiple planes, and also that these canals vary in different specimens as regards actual plane relation to one another and to planes of the skull.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

May 1, 1914.

DR. D. R. PATERSON, *President, in the Chair.*

Pharyngeal Pouch.—Sir W. Milligan.—X-ray photographs of pharyngeal pouches in three patients, aged respectively fifty-five, fifty-four and sixty-three, were exhibited.

The PRESIDENT asked whether the patients had been operated upon. He reminded the Section that there had been two or three cases shown by Dr. Kelson¹ and others. Dr. Kelson had operated upon his under local anesthesia, and had a very good result. The danger was from septic trouble.

Sir W. MILLIGAN replied that he had brought photographs of four cases. Three had been operated upon, and the fourth was being prepared for operation, but was not yet ready because he suffered from carious teeth, and the general condition of the mouth was not as it should be. External operation had been done on the three, and the pouch removed, and these patients all recovered. He had had one fatal case, due to septic pneumonia. He thought it was owing to an error in judgment in removing the feeding tube too soon, for it seemed to have been ingestion pneumonia. Altogether he had seen seven such pouches. The first case he had placed under the care of the late Sir Henry Butlin, and it was the third pharyngeal pouch which had been operated upon in this country.

¹ JOURN. OF LARYNGOL., RHINOL. AND OTOL., vol. xxix, p. 98.

The diagnosis in that case was originally cancer of the œsophagus, but he did not agree with it, neither did Sir Henry Butlin. The patient was still alive, and his age was now eighty. He was indebted to Dr. Hill for calling attention to Halstead's operation. He had not yet performed it. In his series of cases the operation was done at one time. The wound in the œsophagus was as carefully sewn up as possible, and a tube passed through the nose beyond the point of the operation, and kept *in situ* for a week. In the first case he saw with Sir Henry Butlin the wound leaked into the neck for days, but no harm resulted. He felt inclined to do a Halstead's operation in his next case.

Carcinoma of Œsophagus.—Sir W. Milligan.—X-ray photographs of carcinoma of the œsophagus in two patients, aged respectively forty-nine and seventy-one, were exhibited.

Removal of Foreign Bodies from the Œsophagus.—Sir W. Milligan.—(1) *Safety-pin removed from the œsophagus of female patient, aged twenty.*

(2) *Safety-pin removed from the œsophagus of a female patient aged twenty-five.*—Patient arrested for being drunk and disorderly. At police station confessed to having swallowed a button. Button passed ultimately *per rectum*. Two days later had a rather severe attack of bleeding from the throat, followed upon the next day by a still more copious hæmorrhage. Confessed then that she had also swallowed a safety-pin. Admitted to the Royal infirmary. On examination, œsophagus found to contain blood and a safety-pin—the safety-pin lying about the level of the sixth dorsal vertebra. Safety-pin removed with forceps. Œsophagus sponged with solution of H_2O_2 . Rectal feeding. Temperature chart shown. Development of acute suppurative mediastinitis; death. *Post-mortem* examination revealed two ulcers leading through the wall of the œsophagus into the posterior mediastinum.

The PRESIDENT said it was difficult to remove a safety-pin with the point directed upwards, and he would like to know what form of forceps was used. If one could see the point it was well to do as he did in one case, pass a very fine tube over the point, and then not trouble further about the point, but seize the other portion of the pin and withdraw it, knowing that there need be no anxiety about the point. When the point was embedded it was somewhat difficult to manipulate the tube over it.

Mr. HERBERT TILLEY asked how the point was disengaged, and whether Sir W. Milligan closed the safety-pin first.

Sir W. MILLIGAN replied that he used what was practically the President's type of forceps, only longer, heavier, and thicker. They were excellent. For some cases it would be an advantage to have the blades serrated. He passed down the pharyngeal tube so as to cover the point of the pin. In Case 1 he saw the point distinctly, but not in Case 2. He had read of the President's method too late to apply it in this case.

Carcinoma of the Thyroid Gland treated by Radium.—Sir W. Milligan.—Female, aged fifty-six. Operation attempted and found impracticable owing to adhesion to and involvement of the growth in the left common carotid artery and the lateral wall of the trachea. A radium emanation tube (100 mg.) inserted into the growth and left *in situ* for twenty-four hours. Shrinking of the growth noticed within forty-eight hours followed by improvement in swallowing and in general comfort. A microscopical section was exhibited.

Inoperable Fungating Carcinoma of the Œsophagus treated by Radium.—**Sir W. Milligan.**—Male, aged thirty-six. Treated by means of a radium emanation tube (80 mg.); tube retained *in situ* for eighteen hours, followed three days afterwards by a further application of radium (50 mg.) for twenty-four hours. Marked improvement in swallowing; diminution of fetid secretion and of hæmorrhage.

Sir FELIX SEMON said he recently saw an operation performed by Mr. Trotter, in which an extra-laryngeal carcinoma was removed, and by the urgent wish of the patient himself a tube containing 80 mg. of radium emanation was inserted in the place from which the growth had been taken. The operation was beautifully performed, but at first the results were apparently disastrous, because all the tissue round the radium tube melted away like butter in the sun, and the carotid was seen pulsating, lying in a big hole, which extended almost from the clavicle to above the larynx. It was feared that the disintegration of tissue might extend into the chest, and that the carotid might be eroded, but that did not occur. However, unfortunately the patient got pneumonia, from which he died on the ninth day after the operation. Thus the mere insertion of radium emanation in a wound in that neighbourhood was not free from risk. With regard to insufficient screening, the radium emanation and screening were prepared by Mr. Pinch, of the Radium Institute, who had had a very large experience in such matters.

Mr. HARMER said that at his hospital radium had been buried in several cases for carcinoma, either because of glands or of growth in the pharynx, and there was very grave risk that the wound would never close. Two months ago he put some radium in a patient's neck after removing a mass of glands because there was a growth in the mediastinum which could not be removed; 150 mg. of radium were buried in that growth and left there for eighteen hours. Afterwards the wound absolutely refused to heal, and nothing that could be done seemed to influence its indolence. He feared that mediastinitis would result, and possibly death. It should be recognised that there was a difference between applying radium down through the throat and radium buried from the outside into the neck. He believed that radium buried from outside sometimes had a bad effect.

Mr. SOMERVILLE HASTINGS said he had had experience with radium in some sixteen or eighteen cases, but in only one was there sloughing, and that was where he had not taken the trouble to clear out the mouth, but had left some septic teeth remaining. In that case the sepsis came on in the third week after the application. For the œsophagus he had sometimes embedded radium in the posterior wall. But his usual method was to pass a Symonds's tube through the growth and then take the radium tube, cover it with pure india-rubber, and, guided by the œsophagoscope, drop it into the Symonds's tube, attaching a piece of lead to the top of it to prevent it slipping too far down the tube. It kept in position very well, and could be pulled up again quite easily by the attached silk. He found that by this means he was able to keep the radium in the required position much more easily than by means of the usual bent wire arrangement. Moreover, the silk was much less irksome to the patient than the wire. He dilated with the œsophagoscope tube in position and then passed the guide before withdrawal of the œsophagoscope. The Symonds tube or funnel was then threaded over the guide and pushed down the œsophagus the necessary distance.

Sir STCLAIR THOMSON asked whether any member had ever had a

successful case of operation for carcinoma involving the thyroid, taking as a standard of success the absence of recurrence for three years. He had not found a case suitable for operation, and he had frequently persuaded subjects of this condition not to have an operation done. In some cases in which that advice was not followed he knew there was cause to regret it.

The PRESIDENT reminded members that several discussions had ensued at the Section on the treatment by radium. One case of Mr. Tilley's was very satisfactory, so that there was nothing to see when the patient appeared at the Section. Mr. Hastings also showed one patient, who was now well. The present type—namely, the œsophageal ones—seemed more difficult to treat. Information was still needed as to the ultimate effect in these œsophageal malignant strictures. One wanted information as to how long the effects of radium lasted; whether the result of the application was only temporary or permanent. Reference had been made that day to some evil effects of radium, at all events of burying radium in the tissues. The application of this substance should be made with care when dealing with the food passages or air passages. The whole question appeared to be yet in a fluid condition; more information was required before definite views could be formed.

Sir W. MILLIGAN, in reply, said he was referring, not to the use of a radium salt, but to the use of emanation tubes. The point was to get the effect of the γ -ray, and exclude the deleterious effect of the α and β rays. He therefore agreed with Dr. Hill as to the necessity for careful screening. But that was difficult on account of not being able to estimate properly the size of the growth in these regions. A perspective view of the growth might be deceptive. Much remained yet to be learned in regard to screening. In answer to Sir Felix Semon's remarks, he regarded it as impolitic to irradiate healthy tissue. In the case narrated by Sir Felix, a tumour was apparently beautifully removed, and presumably completely, by the operation, and yet the healthy tissues were irradiated, and sloughing resulted. Mr. Tilley's case was sarcoma, and if there was one condition which disappeared quickly under radium it was sarcoma. It was quite different with carcinoma, and even now the exact dosage of radium for different types of carcinoma was not known. In several years' time probably the profession would have definite information as to dosage for different types. He agreed with Sir StClair Thomson's remark as to malignant disease of the thyroid. He had seen a fair number of such cases, but he did not know of any one, whether operated upon or not, which was alive three years afterwards. It was difficult to determine whether the thyroid was adherent to the trachea. The lady referred to was examined by two or three of his colleagues, and it was thought that the growth was not adherent to the trachea. When he cut down and found it was adherent he gave up the operation, knowing how unsatisfactory these cases were. For that reason, also, he put in an emanation tube, and it had a very extraordinary effect in relieving the symptoms, though he did not expect that it would do more than that. Certainly it had increased her comfort both in swallowing and breathing. With regard to the other case, since he wrote the note the patient had died. He had acute pericarditis, with much effusion into the pericardium. He did not know whether it was connected with the application of radium or not. The patient was an old rheumatic subject, and had had endocarditis. He had only three days' illness. In his case the radium was well worth using, because it relieved his condition so much. The emanation tube was kept in twenty-four hours, and he

had no attack of hæmorrhage after its application, and within a few days the pain in his ear had disappeared.

Laryngeal Neoplasia.—**W. Jobson Horne.**—The patient, a woman, aged fifty-two, had suffered from loss of voice for over twelve months. The aphonia gradually developed. The neoplasm sprang from the anterior part of the larynx. The patient was by no means an easy subject for direct or indirect laryngoscopy. The mouth was not opened well, and the tongue was thick and unyielding. With a little training he hoped that it would not be necessary to fall back upon the direct method. When removed the growth would probably be found under the microscope to be innocent.

Mr. CLAYTON FOX thought it was an cedematous hyperplasia, springing from the anterior end of the left vocal cord, and not from the commissure.

Mr. CYRIL HORSFORD considered that the growth had an infiltrating character, that it grew from the anterior half of the left vocal cord, but there was much surrounding congestion and thickening of cord, and if a piece could be removed he thought it should be carefully examined under the suspicion of malignancy.

Dr. JOBSON HORNE replied that at present he was not quite certain where the growth originated. He looked upon the growth as an excrescence, not as infiltrating, and he regarded it as innocent.

Unusual Webbing of the Soft Palate.—**W. Jobson Horne.**—The patient, a man, came under notice on account of deafness. There were no symptoms referable to the throat. The soft palate, however, presented a most unusual appearance. The arches between the uvula and the anterior pillars of the fauces were filled in with a web which extended down to the tip of the uvula. The webbing was extreme.

Mr. CLAYTON FOX thought the condition of the palate was congenital. He knew of a similar case (in a female) though not so pronounced. It was not giving rise to any phonetic troubles, for although there was occasional hoarseness, this was due to chronic laryngitis, the result of nasal obstruction. He suggested a submucous resection as the only treatment applicable to such a case.

Dr. JOBSON HORNE replied that he was aware of some nasal obstruction; he had, however, shown the case, not with reference to the nasal septum, but on account of the abnormal condition of the soft palate with which he did not propose to meddle.

A Further Report upon a Case of Laryngeal Neoplasm.—**W. Jobson Horne.**—The growth occupied the right vocal cord. When the patient, a man, was before the Section at the January meeting¹ opinions were divided as to whether the growth was an epithelioma or a gumma. Prior to that meeting anti-luetic treatment had been instituted, and since then it had been pushed, and salvarsan had been given. Dr. Jobson Horne had heard that the laryngeal condition had cleared up considerably under the treatment.

Complete Paralysis of the Left Vocal Cord.—**E. A. Peters.**—E. S.—, previously exhibited (March 6)² with left abductor paralysis and œsophageal growth. The patient was seen again on March 16, when

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxix, p. 298.

² *Ibid.*, vol. xxix, p. 510.

it was evident that the left cord was completely paralysed. The cord was curved and the arytaenoid prolapsed forward. There was no respiratory movement. The patient spoke with a husky, thin voice. On vocalisation the left cord does not approach the other, but remains in the cadaveric position.

Mr. CLAYTON FOX remarked that there was a twitching of the arytaenoid on the paralysed side, showing that there was no ankylosis of the crico-arytaenoid joint.

Dr. JOHNSON HORNE said that the case illustrated the importance of noting an alteration in the voice as possibly a valuable clue to a deep-seated disease, and also the importance of investigating the cause of that vocal change by means of the laryngoscope. Loss of voice, or even huskiness, due to paralysis of the vocal cord, through implication of the left recurrent laryngeal nerve, might be the first indication of the œsophageal growth.

Dr. PETERS replied that when he previously showed the case there was only abductor paralysis of the left cord; and in view of Sir Felix Semon's remarks that it was exceptional for these cases to be traced through from one stage to the other, and as within a week of exhibiting the patient at the Section, complete paralysis of the left cord had developed, he hastened to bring the case up. There was a growth a considerable way down the œsophagus, and he thought the history and present condition excluded ankylosis. He regarded it as a paralytic condition due to involvement by glands.

Microscopic Specimen of Growth on Anterior Third of Left Vocal Cord.¹—James Donelan.—A woman, aged twenty-six. In view of the suggestions made in the course of the discussion, the removal of the growth was attempted by the direct method. Owing, however, to the patient's perfect set of teeth, and the unusually short distance from them to the epiglottis, it was impossible to pass a tube behind the epiglottis in a satisfactory position for an operation of this kind, though several attempts were made by a colleague accustomed to the manoeuvre as well as by the exhibitor. The growth was removed a day or two later by indirect method, when it was found to have the structure of a papilloma.

Microscopic Specimen from a Growth on the Anterior Third of the Right Vocal Cord.—James Donelan.—By a curious coincidence a day or two before the preceding case was operated on this patient, a woman, aged forty-four, presented herself with a warty-looking growth in an exactly similar position but on the opposite cord. It was decided also in this case to attempt the removal by the direct method. The patient being endentulous an excellent view of the larynx was obtained, but just at the moment when the forceps were being introduced for the removal of the growth the battery, which had been used for a long time in connection with the previous case, suddenly failed, and as it was impossible at the moment to get another the removal was deferred and was carried out easily on the following day under local anæsthesia by the indirect method. The specimen appears to show the structure of a papilloma.

Sir STCLAIR THOMSON, referring to both these cases, pointed out that the attempt was made to remove the growth by the direct method, but it failed in each case; and in one of them it was said the growth was "easily" removed the following day by the indirect method. That led him to ask if it was becoming the fashion to use the direct method first

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxix, p. 510.

in laryngeal cases, and if so, why? He also asked if it was becoming more frequent on account of the haste to be in the fashion. He had no hesitation in speaking on this subject, because he did not feel that he was behind the fashion, seeing that he was one of the first to go to Freiburg to study the method, and he believed King's College Hospital was one of the first institutions to have Killian's outfit in London. He asked Professor Killian recently in Berlin, and he had also asked Professor von Eicken the same question, whether they always used the direct method? The reply was that they never used the direct method when the indirect sufficed. He believed it was a Hippocratic principle which should be remembered, that removal of anything should be *tuto, cito et jucunde*. He asked anybody present to let a skilled person pass a Brünning's tube into his larynx, in order to cauterize or perform a simple operation, and then to let him (the speaker) do it by the indirect method, and report as to which was the more "*jucunde*"! He had no hesitation in saying that the majority would detest the direct method, and there would be no complaint in the majority of cases from the indirect method. He heard of this tube being passed down into the larynges of unfortunate tubercular patients in order to have lactic acid swabbed about or to have the galvano-cautery applied—a most unsuitable method. By the indirect method one had before one the whole larynx in a panoramic view, and it was much easier to apply the galvano-cautery, and it could be done more thoroughly "*tuto, cito et jucunde*" than by the direct method. He made that appeal for the sake of the patient. Both these patients now reported were submitted to several attempts, even by a colleague accustomed to the necessary manoeuvres, yet it had to be given up. Perhaps Dr. Donelan would explain why, in the case of each of these patients, he did not use the indirect method. He (the speaker) regarded the indirect method as most unsuitable for growths in the anterior commissure also. In order to be in the fashion years ago, in several cases he tried the direct method, and in one case in which he failed he removed the growth easily by the indirect method by the help of Horsford's epiglottis suture. The patient told him afterwards what a torture the first procedure was, and how tolerable was the second. He was not now referring to suspension laryngoscopy, because there were cases in which the suspensory method was very suitable. What he wished to do was to enter a plea against attempting to do work on the larynx by the direct method when it could be done more "*tuto, cito et jucunde*" by the indirect.

Dr. JOBSON HORNE agreed generally with all that Sir StClair Thomson had said. To his own patient he mentioned that it would be necessary to remove the growth, and the patient expressed a wish for a general anaesthetic. Personally, he would prefer to remove it under cocaine and by the indirect method. The Section was much indebted to Dr. Donelan for having brought the cases. They were very instructive as showing the importance of teaching the rising generation how to use the indirect method. Years ago in that Section he expressed the hope that the art of removing laryngeal growths by the indirect would not be killed by the direct method in the way that the art of miniature painting had been killed by photography. Moreover, it must not be forgotten that direct endoscopy has its mortality.

Sir FELIX SEMON said he had at first not intended to take part in this discussion, because he belonged to the "old guard," and had retired. Anyone who, under such circumstances, spoke in defence of an "old-fashioned" method, like indirect laryngoscopy, was likely to be considered as an old fogey. But when it was said that the younger

laryngologists would not "take the trouble" to learn the indirect method, the old fogey could not help asking himself, "Were they laryngologists, or were they not?" If that were the attitude of the younger generation, it was a very unfortunate one for the specialty to which he had devoted his life. The art of removing laryngeal neoplasms by the indirect method had in his own day justly been looked upon as the "blue ribband" of laryngology. He agreed with Sir StClair Thomson's remark that operations should be done not only *cito* and *tuto*, but also *juvande*. In 1901¹ he had published lectures which, at that time, caused considerable controversy about the use of modern methods of treatment in diseases of the upper air passages, in which he had quoted the Gilbertian saying that, "The punishment should be made to fit the crime." He still was of opinion that it was the duty of the laryngologist to make the "punishment"—i.e., his method—fit the "crime"—the disease. The direct method, which surely was anything but pleasant for the patients, should not be applied when the indirect one would suffice. He had always tried to avoid being in the rearguard, and he had welcomed all useful new methods, whether they were direct or suspension laryngoscopy, but he would deeply regret if the indirect method of removing growths from the larynx, which not so long ago was considered the main reason why laryngology should be recognised as a distinct specialty, should be superseded simply because some of the younger generation did "not want to take the trouble" to learn it.

Mr. WAGGETT pointed out that the younger members of the specialty did not to-day get many chances of removing growths from the larynx, and he was inclined to urge them to take every opportunity of practising with angled probes and forceps, lest an essential element in the delicate art of laryngology should be forgotten and wholly superseded by the easy but comparatively rougher methods of direct endoscopy.

The PRESIDENT said members would all feel indebted to Dr. Donelan for his cases, because by bringing them forward he had performed a service to the Section. He (Dr. Paterson) had used both methods for a considerable time; and he thought everyone would agree that, where a general anæsthetic was necessary, the direct method was the one possessing the greatest advantage. He did not know that suspension had made much difference in the matter of diagnosis, or for the removal of growths from the anterior commissure. He still thought suspension laryngoscopy unsatisfactory in that respect. Only two days ago he found it difficult to remove by that means the remains of a papilloma from the anterior commissure of a patient, perhaps partly because laryngo-fissure had been performed on the patient a year before and the larynx was fixed by scar tissue to the skin. The remarks of Sir StClair Thomson should be borne in mind; there was no doubt some people tolerated the direct method very badly. He remembered the days before the Killian tubes came in, when Kirstein's tubes were used, involving considerable pressure on the tongue, so that only one-sixth of the patients he tried it on at that time could tolerate it. He therefore gave up the method until Killian produced the tube-spatula, which required less pressure and was very much better for the patient. If he could get away a growth by the indirect method, he preferred it; he considered it was better for the patient, and he did not find it difficult as he had been trained to it. But, on the other hand, many men had become very facile with the direct method. He remembered Prof. Hartmann, three years ago, speaking of the value of local treatment in tuberculous laryngitis and showing a tube-spatula, which differed but

¹ *Brit. Med. Journ.*, 1901, ii, pp. 1313, 1396.

little from the ordinary one, except that it had a wider entrance; Hartmann said it was easily introduced, and that he had been using it in tubercle of the larynx with great advantage. Perhaps patients in this country were not so tolerant as those on the Continent. Attention should be paid to what Sir Felix Semon and Sir StClair Thomson had said, but he would be very sorry now to give up either method.

Mr. DONELAN replied that Sir StClair Thomson had apparently forgotten their conversation about one of these cases at the previous meeting, in the course of which he (Dr. Donelan) had suggested this might be a good opportunity of getting up an informal discussion on the relative merits of the two methods. "Why" he had used the direct method in these cases was simply that he felt he had as good a right as anyone else to do what was apparently the everyday practice at present and he felt that for once he ought to be in the fashion. As regards the "*juvenile*" part of it, as both patients were very nervous he gave them chloroform. They consequently suffered no inconvenience and had so little subsequent irritation that it was possible to remove the growths completely next day by the indirect method. With the exceptions already referred to, he was a believer in the advisability of at any rate attempting the removal of all laryngeal growths by the indirect method. He had long ago learned and practised that method under Sir Morell Mackenzie, one of its most brilliant exponents. He was sorry to gather that the rising generation were not more regularly practising the indirect method, as, apart from the removal of the growths, its use conferred great dexterity in all kinds of intra-laryngeal treatment. Perhaps he might usefully recall the suggestion of Sir Morell Mackenzie that it was not at all necessary to have a "phantom" larynx or other elaborate arrangement for practice. A dice-box served very well, and he had frequently seen Sir Morell Mackenzie "keeping his hand in" by picking small objects out of one by the indirect method.

An Œdematous Fibroma depending from the Left Vocal Cord.—**L. H. Pegler.**—Patient, a woman, aged fifty, complaining of hoarseness. On the left vocal cord can be seen an œdematous fibroma which occupies the greater part of its free border and rises above the glottis on expiration.

Dr. JOHNSON HORNE regarded the growth as one for removal by the indirect method, which showed it very well. Exception, he thought, might be taken to the term "œdematous fibroma," by which the growth was described in the notes. Speaking generally, the terminology of growths of the vocal cords was far from perfect, inasmuch as it was not sufficiently descriptive of their histo-pathology. The œdematous appearance of growths springing from the anterior part of the vocal cord or the sinus of Morgagni was due to dilatation of the lymph-spaces and cystic degeneration.

Mr. DE SANTI regarded it as solid fibroma, not cystic.

Dr. PEGLER replied that the growth was essentially a fibroma, œdematous from position. He showed an almost exactly similar case about seven years ago (reported in the first volume of the Society's *Proceedings*).¹ He would remove the growth by the indirect method.

Note.—Dr. Pegler wishes to add (June, 1914) that the growth was removed in one piece by Mackenzie's laryngeal forceps. Under the microscope the section showed a highly œdematous, but not cystic fibroma.

¹ *Proc. Roy. Soc. Med.*, 1908, i, pp. 8, 29.

Chondrosarcoma of the Pharynx.—**C. I. Graham.**—Patient had complained of sore throat for one year. During the last two months he had noticed a swelling in the pharynx which increased rapidly in size; for fourteen days a swelling below the jaw on each side of the neck. There had been no dysphagia, but occasional attacks of choking. He thought that he had lost weight. He had been subject to bronchitis for many years. Recently there had been an excessive expectoration of blood-stained mucus. In the region of the left tonsil there was a large nodular swelling of a grey colour, but not ulcerated. On the right side a similar smaller mass could be seen; also some nodular growths on the arch of palate. The submaxillary glands were enlarged on both sides. Sections of growth were reported to show chondrosarcoma.

Mr. DE SANTI thought it a very good case for diathermy. Part of the growth could be scooped out and the residue treated by diathermy. It would not cure the patient, but would give considerable comfort and prolong life.

(?) **Lupus, Syphilis, or Mixed Infection of Nose, Right Ear, Pharynx, and Larynx.**—**P. de Santi.**—Boy, aged sixteen, who for two years has had severe ulceration of soft palate and pharynx, with a purulent right ear discharge. For eight months he has had an exuberant ulceration of left alae nasi. No history of syphilis, congenital or acquired; no phthisis in family. No tubercle bacilli in expectoration; Wassermann reaction twice at Westminster Hospital strongly negative; twice elsewhere once negative, once modified Wassermann positive. The patient was sent by Dr. Sibley, who is treating the boy for his skin lesion. A section of the nasal region has been made and pronounced to be "typical epithelioma." On seeing the boy the one thing I was positive of was that the microscopic diagnosis was wrong. Examination reveals old scarring of soft palate and pharynx with typical syphilitic appearances. Uvula and epiglottis gone. Swollen, pear-shaped arytenoids and ulceration of vocal cords. The patient was shown by Dr. Sibley at the Dermatological Section in January; half the members were positive as to a syphilitic and half as to a lupus origin. My opinion is that the disease is lupus. Another section from the nasal lesion reveals lupoid tissue with giant cells.

Dr. H. J. DAVIS suggested that the condition might be glanders, and that the patient's reaction to mallein should be tried. He agreed that the palate condition looked like syphilis, but syphilis, as a rule, yielded to treatment and so did lupus.

Mr. CLAYTON FOX thought the condition was lupus all through.

Mr. DE SANTI replied that the case was first sent to him with the diagnosis of epithelioma. A piece of growth had been taken from the nose by Dr. Knowsley Sibley, and the microscopic report was, as already stated, "typical epithelioma." This it certainly was not, however. The scarring of the soft palate and posterior wall of the pharynx was highly suggestive of syphilis. The patient had lost his uvula and epiglottis. The Wassermann test had been done four times; thrice it had been negative, and once mildly positive. There were no evidences of syphilis in the patient or the family. Among dermatologists some said it was syphilis and others that it was lupus. He regarded it as lupus throughout. There were giant cells in a fresh section taken from the nose growth, but no tubercle bacilli had been found at all. He was at present giving iodine of potassium.

Perithelioma of Pharynx.—J. Coubro Potter.—Female, aged forty-seven, married. Complained one year ago of swelling behind angle of jaw, right side. Thought it was a gland. No previous illness. No loss of weight. Family history: Father died of cancer, aged seventy-five. Present illness: Patient complained of slight pain in throat. No pain on swallowing. When examined, a large swelling could be felt on right side of pharynx: movable, not painful. Growth was bulging soft palate. On palpation with finger behind angle of jaw the growth was the size of a hen's egg and was easily movable. It was tense, and felt somewhat cystic. The opinion was, at the time of examination, that the growth was encapsuled. No definite attachments could be made out. Previous to coming to hospital the family doctor had explored with a hypodermic needle, with negative results. No enlargement of glands or any other growth. Treatment: Examination under CHCl_3 confirmed the diagnosis, and the tumour was enucleated. Very slight hæmorrhage. Examination of growth: Naked eye showed a definite capsule. On section the appearance somewhat resembled adipose tissue, and one portion was specially hard. Microscopically, the pathologist reported perithelioma.

Dr. LEATHAM said he cut the sections, and he regarded it as an endothelial tumour. He was doubtful whether to apply the name perithelioma or endothelioma: it was encapsuled. Endotheliomata were mostly benign, although occasionally they formed secondary growths. The tumours sprang from the endothelial cells lining lymph spaces or from small blood-vessels. In this case, he would say, from the latter origin, as so many of the spaces contained blood.

Mr. LAYTON did not agree with the verdict given on the section. Though he was not a pathologist, it looked to him like an epithelial tumour. The late Mr. Targett, with whom he had seen many sections, laid it down that a tumour should not be called endothelioma until it was certain it was not anything else: and there should be evidence of its arising from the lining of blood-vessels or from endothelial tissue. There did not seem to be any sign of that in this section. There were two or three layers which did not seem far removed from stratified epithelium. He suggested it was an adenoma, with a large amount of fibrous tissue from the wall of the pharynx. Another suggestion was that it was a tumour arising in gland tissue.

Dr. JOBSON HORNE said he saw the case before the removal of the tumour, and he did not regard it as malignant, but as innocent. He suggested that Dr. Potter be asked to bring the case up again, complete with all the clinical notes and histological reports on the growth for further discussion. (Mr. Shattock, the pathological referee, reports that the growth is a perithelioma.)

Epithelioma of the Epiglottis and Base of the Tongue.—William Hill.—Man, aged sixty-two, had been under treatment at hospital for two months for Eustachian obstruction. At his last visit, a week previously, it was noticed that the patient was a little hoarse, though he had never complained of throat trouble. On examining with the throat mirror the epiglottis looked as if it had been partially amputated, and was nearly $\frac{1}{3}$ in. thick: the lesion looked more like old lupus than subacute tuberculosis, but as the mammillated swelling was also seen in the glosso-epiglottic fossa the possibility of its being malignant was recognised. The rest of the larynx was normal in appearance. A portion was removed for microscopic examination, and the case was proved to be

one of epithelioma. As the disease was at present rather limited, and no enlargement of the glands could be *felt*, the case appeared to be very suitable for operation. Would a subhyoid pharyngotomy give sufficient access for removal of the epiglottis and adjacent parts of the tongue?

MR. DE SANTI said that in the four or five cases he had had in which the growth was quite limited to the epiglottis, he had obtained good results from median thyrotomy—laryngo-fissure. It allowed one to get well at the base of the tongue, and it disturbed the patient less than did a lateral pharyngotomy. Three of the cases were still well, two and three years after the operation. In every case he removed the glands on both sides of the neck thoroughly, whether they were enlarged or not.

Abstracts.

PHARYNX AND NASO-PHARYNX.

Neuenborn, Robert (Crefeld).—The Operative Treatment of Hard Fibroma or Fibro-sarcoma of the Base of the Skull. "Zeitschrift für Laryngologie," Band vi, Heft 6.

The author remarks that cases are on record in which naso-pharyngeal fibromata have disappeared spontaneously about the age of twenty years. Until comparatively recent years, cases of hard fibroma have been treated by general surgeons who either split the hard and soft palates or performed temporary or permanent resection of the upper jaw. The author holds that it is questionable if these operations are not more dangerous than the tumour itself. On the other hand, attempts have been made with the cold wire or galvano-caustic snare, electrolysis, forceps, spoons, and curettes to remove the growths by the natural passages. These methods require many sittings. Neuenborn has had eleven cases and has operated on none of them.

J. S. Fraser.

Trautmann, Gottfried.—A Plastic Variation in the Operation of Tonsillectomy by Blunt Dissection. "Münch. Med. Wochenschrift," Nr. 22, 61 Jahrgang.

In cases in which the anterior and posterior pillars are parallel, or where the former has a more medial extension than the latter, the author was in the habit of removing a crescentic part of the anterior pillar, the curved incision extending from the lingual prolongation of the pillar to the base of the uvula. This procedure was adopted in order to avoid subsequent functional disturbance.

In order to preserve the anterior pillar in all cases of tonsillectomy, Trautmann now dissects the above-mentioned crescentic portion of the anterior pillar free from the tonsil capsule from the plica triangularis downwards to the base of the tongue, and, holding it forwards with a forceps until the tonsil is removed, he tamponades it back in the tonsillar depression, the tampon being held in place for from four to six days by loose stitches through the faucial pillars. Whilst admitting that this latter procedure has more to recommend it than that first described, it is difficult to see what real advantage is to be derived from this method, which prolongs both the operation and the patient's subsequent discomfort.

J. B. Morgan.

Levinger.—The Treatment and Prophylaxis of Peritonsillar Abscess.
 "Münch. Med. Wochenschrift," Nr. 23, 61 Jahrgang.

With the object of killing two birds with one stone, viz. evacuating the abscess and preventing a recurrence, the author suggests dissection and extirpation of the upper pole of the tonsil at as early a stage of the inflammatory attack as possible. Levinger states that after a preliminary painting with cocaine this manipulation can be carried through almost as quickly and painlessly as the usual incision at the site of election, and that, whilst it is less likely to open lymph- and blood-vessels to infection, it is practically certain of ensuring thorough drainage. (It is reasonable to infer that the mere application of cocaine and the injection of novocain might in itself occasion almost as much pain in this exquisitely sensitive affection as would be caused by the historic but very rapid method of incision.—Abs.).

J. B. Horgan.

NOSE.

Beck, Joseph C.—Histologic Pathology of the Accessory Sinuses.
 "Annals of Otology, etc.," vol. xxii, p. 914.

The author concludes that the pathological changes found in the middle turbinates and everted portions of the ethmoid in asthma cases and in non-suppurative sinusitis are very striking, in that the bone shows rarefaction somewhat resembling that found in early bony changes of osteomalacia, acromegaly and otosclerosis. This is suggestive of a possible etiologic factor in some disturbances of the polyglandular systems or the glands of internal secretion.

In the non-suppurative sinusitis the conspicuous absence of inflammatory elements, as the round-cell infiltration and the presence of inflammatory edema or myxomatous degeneration at the expense of loss of glandular structures is very apparent. In the suppurative forms of sinusitis the great prevalence of round-cell infiltration with tendencies to necrosis and granulation formation is very characteristic. The lining of the larger sinuses, antrum, frontal and sphenoid, in the markedly protracted suppurative types, is so changed as to preclude resolution, and no matter how well these cavities may be drained and ventilated their obliteration or eradication cannot be brought about unless the entire epithelial lining is destroyed.

The pathological characteristics of both suppurative and non-suppurative forms of sinusitis are very frequently met with in combination in the same case.

Lastly, Beck thinks that the great similarity in the changes of atrophic rhinitis in the early stages, and of non-suppurative sinusitis, especially in the bone, would suggest a similar etiologic factor in the disturbances of the glands of internal secretion. The paper is illustrated by twenty-seven micro-photographs.

MacLeod Yearsley.

van Irterson (Leiden).—A Combined Nasal and Accessory Sinus Polypus.
 "Zeitschrift für Laryngologie," Band vi, Heft 6.

The patient was a female, aged eighteen, who had suffered from nasal obstruction (right side) during expiration only, for one week. She also complained of a feeling of foreign body in the throat. Anterior rhinoscopy showed a small polypus in the middle meatus, while posterior rhinoscopy revealed a large polypus in the naso-pharynx. Both antra illuminated well. On attempted removal with the snare the polypus burst and yellow fluid came away.

J. S. Fraser.

Slaney, C. N.—Multiple Round-celled Sarcoma originating in the Nares. "Lancet," 1914, vol. ii, p. 942.

Man, aged forty-three, complaining of nasal obstruction, stated to be due to polypus. A growth had been removed three years previously and had not recurred. The naso-pharynx was occupied by a fleshy, movable, pedunculated growth the size of a walnut and purplish in colour. It was partially removed by a wire snare under local anaesthesia. Eleven months later the right naris was obstructed by fresh growths. Later soft, fluctuating swellings appeared under the scalp in the mid-frontal line. Seven months later he fell, sustaining a fracture of the right femur and left tibia and fibula, right radius and ulna and left elbow. Other tumours appeared under the scalp, in the fingers and instep, and three months later headaches and attacks of epistaxis were common. Death ensued about two years after he was first seen. *Post-mortem*, many secondary tumours were found and a large fungating growth originating in the muco-periosteum at the base of the skull occupied the naso-pharynx and nose. Microscopically, the growth was a round-celled sarcoma.

Macleod Yearsley.

LARYNX.

Thomson, Sir StClair.—Intrinsic Cancer of the Larynx. "The Lancet," vol. clxxxv, p. 1523.

Describes the case of a woman, aged fifty-three, in whom the complete excision of an intrinsic epithelioma was apparently effected by endolaryngeal operation. The conclusions drawn from the case are: (1) Cancer of the vocal cord is, in early stages, a very slowly progressive and strictly limited process. Alteration of voice is the principal, and may be the only, symptom. (2) Diagnosis is based chiefly on inspection of the larynx. (3) The growth, even when it occupies almost the entire length of the vocal cord, can sometimes be completely removed by endolaryngeal operation in early cases. But this completeness can only be ascertained when, by laryngo-fissure, the remains of the vocal cord and adjoining soft parts have been removed and submitted to the pathologist. (4) Laryngo-fissure is, therefore, the operation of choice in all cases of endolaryngeal cancer. (5) The operation offers the very best prospects. (6) Statistics show a lasting cure in 80 per cent. of cases.

Macleod Yearsley.

Pugnat (Geneva).—Spontaneous Cure of a Carcinoma of the Larynx. "Arch. Internat. de Laryng., Otolog., et Rhinol.," May-June, 1914.

The salient points of this remarkable record are that a laryngeal tumour, proved histologically to be carcinomatous, slowly atrophied as a result apparently of an injection of adrenalin, so that at the end of six months the larynx was anatomically and functionally normal. An enlarged submaxillary gland, however, remained, and at the end of another six months had increased to an enormous mass of glands, which killed the patient by eroding the carotid, the larynx meanwhile remaining normal.

H. L. Whale.

Imhofer, R. (Prague).—Laryngeal Phthisis and Pregnancy. "Arch. Internat. de Laryng., Otolog., et Rhinol.," May-June, 1914.

Three questions arise:

First: Does pregnancy actually predispose to tuberculous laryngitis?

The disease is fortunately not common. Since the time when the author began a systematic examination of the larynges of all pregnant

women, he has found no increase of this disease as compared with its incidence in other women.

Glas and Kraus, by infecting the larynges of female guinea-pigs with tuberculosis, made them refractory to conception. In 50 per cent. of pregnant women the author found hyperplasia and other lesions of the mucosa, which bore no relation to tuberculosis, but might by their histology cause confusion of the question. And Kuttner suggests that the cases reported as tuberculous laryngitis cured by pregnancy, may have been simply this "laryngitis of pregnancy."

To sum up: There is no evidence that pregnant women are more susceptible to tuberculous laryngitis; but in a case of this disease, the physiological submucous engorgement which supervenes on pregnancy renders the laryngeal plithisis hyperacute.

Second: What is the prognosis of the laryngeal disease in relation to confinement? That is to say, what laryngeal complication would be induced by the parturient state?

The cries of a woman in labour and the effort to expel the fœtus aggravate any existing laryngeal lesions. The physiological laryngeal engorgement of pregnancy is, during labour, exaggerated into œdema. Granted that pregnancy makes the prognosis worse in tuberculous laryngitis, then labour may aggravate this aggravation to the point of rapid ulceration and sudden œdema necessitating tracheotomy.

Third: What line of conduct should laryngologist and obstetrician adopt in a case of pregnancy complicated by tuberculous laryngitis.

When a frank tuberculous laryngitis makes its first appearance at the very beginning of a pregnancy, probably neither will the mother survive to full term, nor will the child, if born, be viable. Accordingly, abortion, followed by removal of the ovaries, has been the practice in the author's clinic in the first five months of pregnancy in a woman with tuberculous laryngitis.

Conversely, after the fifth month, the results of artificial abortion are deplorable. Without abortion, in these later months the prognosis is better for the mother's larynx than for the child's viability.

As regards treatment, any surgical intervention, other than tracheotomy, must be postponed until after the confinement. The author is in favour of tracheotomy when dyspnoea is definitely established; but not as a prophylactic against a possible dyspnoea during the course of labour; nor, as some hold, because it may cure the tuberculous laryngitis; this latter the author has never known to occur.

Pregnant women with laryngeal plithisis should never be confined at their own homes. Delivery should be hastened with forceps.

H. L. Whale.

EAR.

Toubert, J.—Bullet-wounds of the Mastoid Process in War. "Arch. Internat. de Laryng., Otolog., et Rhinol.," May-June, 1914.

These are rarely seen *aut-mortem*. In the author's case the bullet traversed the mastoid and lodged in the neck without damage to the facial nerve, the labyrinth, or the jugular bulb. After briefly quoting other cases, he concludes that bullets entering by the external meatus strike the dense bone of the petrous, which splits as would the diaphysis of a long bone. But if entering the mastoid behind the ear, the bullet impinges on spongy bone which does not split, and the results are less serious.

H. L. Whale.

Botella (Madrid).—Circumscribed Otitis Externa simulating Mastoiditis. "Arch. Internat. de Laryng., Otolog., et Rhinol.," May-June, 1914.

Circumscribed otitis externa differs from furunculosis in that the former has no relation to a hair-follicle. The author considers that the usual infection is streptococcal. The diffuseness of the meatal stenosis is the feature which simulates mastoiditis. Rigors may add to the difficulty. Confirmatory evidence may be given by glycosuria.

In otitis externa tenderness of the tragus is marked, whereas pressure applied over the antrum, *without displacing the auricle*, is painless. The converse is true of mastoiditis.

The author quotes many other diagnostic points, one of which is often neglected—that in otitis externa the meatal swelling decreases as we proceed inwards, in mastoiditis *vice versa*. *H. L. White.*

ŒSOPHAGUS.

Wile, U. J. (Michigan Univ.).—Syphilis of the Œsophagus. "Amer. Journ. Med. Sci.," Aug., 1914.

In view of the high susceptibility of the mouth and the pharynx in early syphilis and the not infrequent occurrence of syphilitic manifestations in the rectum late in the disease, the apparent immunity of the remainder of the digestive tract, including the Œsophagus, is remarkable. In a large number of the cases of syphilis of the Œsophagus which have been described there were lesions in the mouth or pharynx suggesting a special localisation of the disease in the digestive system.

The not infrequent dysphagia which occurs in secondary syphilis may be due to superficial erosive syphilides. The cases described, however, belong to the tertiary stage, when the condition is one of gummatous ulceration followed by localised scarring or a diffuse contraction encircling the tube for the greater part of its length and causing more or less complete stenosis.

The case which the writer describes showed, on examination by X-rays and the Œsophagoscope, a marked sclerosis of the entire tube with two definite strictures, one at the upper end, and the other just above the cardia. Immediately above each of these was a dilated portion. Salvarsan and mercury together with dilatation gave rise to a marked improvement.

The differential diagnosis of the disease is often extremely difficult and especially so in the late stages when there may be marked cachexia. The discovery on X-ray examination of two strictures separated, as in the writer's case, by a relatively normal portion of the tube is, of course, suggestive of syphilis rather than malignant disease.

In the author's opinion syphilis of the Œsophagus, though a rare condition, is not so infrequent as the rather scanty literature would seem to indicate. It is not improbable that many cases which die in cachexia supposedly with carcinoma of the Œsophagus are in reality cases of death from marasmus as a result of syphilitic Œsophagitis. It is more than likely also that the same relation which Billroth showed to exist between gumma and carcinoma in the case of the tongue holds good also in reference to the Œsophagus. *Thomas Guthrie.*

MISCELLANEOUS.

Fischer, A.—Thymectomy in the Treatment of Tracheostenosis.
 "Münch. Med. Wochenschrift," No. 21, Jahrgang 61.

The author defines tracheostenosis spastica as that condition in which suffocation is imminent owing to the presence of an hypertrophied thymus. This condition is especially prone to occur in infancy owing to the anatomical conditions present. Klose states that a fatal case never occurs without prodromal symptoms such as slight dyspnoea and cyanosis. There is often a slight but continuous stridor, especially at the end of inspiration. In many cases the respiratory difficulty disappears with growth, in others the patient succumbs to the first or more often to the second suffocative attack.

These children are as a rule badly nourished owing to their difficulty in taking the breast and the resulting cardiac weakness lessens their power of overcoming the attack.

The diagnosis is difficult as the affection has to be distinguished from congenital anomalies of the larynx, laryngeal papilloma, glottic oedema, spasm of the glottis, peribronchial adenitis, retro-pharyngeal abscess and recurrent paralysis. The purity of the voice during the free intervals excludes affections of the larynx or pharynx, whilst the presence of stridor is against glottic spasm. In the supra-sternal depression a soft round tumour may be felt during the expiratory act. The results obtained by percussion and radiography do not furnish reliable information. In the absence of physical signs Klose bases his diagnosis alone on the existence of a chronic stenosis of the deeper organs of the neck with paroxysmal exacerbations, or on the occurrence of dangerous dyspnoea which is accompanied by the formation of a tumour in the jugulum during expiration. He advises surgical intervention in such cases.

From the study of a case in which he found it necessary to operate himself as well as of the literature of the subject the author has arrived at the conclusion that partial intra-capsular thymectomy with subsequent thyreopecty (suturing of the anterior part of the thymus capsule to the periosteum of the sternum) is the most suitable operation in cases needing surgical intervention, that by this means the threatening symptoms are at once relieved and a beneficent influence exerted on the general condition of the patient and the whole status thymico-lymphaticus. The author's patient suffered from an intractable eczema which, just as in the case reported by C. A. Parker, disappeared at once after the operation.

J. B. Morgan.

Alex MacLennan.—The Technique of Thymectomy. "Brit. Med. Journ.," October 3, 1914.

A short paper recounting the effect of removing the whole or part of the thymus gland for the relief of asphyxial attacks ("false croup," "laryngismus stridulus" and the like) in little children. The author has operated in eight cases. In two of these it was found possible to remove the whole gland, but in all the others its size and relations rendered complete removal impossible without resecting the sternum, and this the author did not attempt. As to results, three recovered from the operation and were freed from the "crowing" attacks; one recovered from the operation, but received no benefit from it; the rest died as a result of asphyxial seizures at periods varying from a few days to six weeks after

operation. In the fatal cases only a portion of the gland could be removed.

The technique adopted was as follows: A ($\frac{1}{2}$ vertical) incision was made through skin and subcutaneous tissue of the episternal notch. After clearing the small sternal muscles the cervical horns of the thymus were reached under the sterno-thyroid. The loose capsule having been separated, the left lobe was pulled out of the thorax by a "hand-over-hand" action of two pairs of blunt forceps. This done the right lobe was similarly extracted. Bleeding was not troublesome.

This manipulation is easy if the gland is of a normal size, but when it is enlarged resection of the upper part of the sternum is necessary. For that reason the author looks upon the method just described as insufficient, and, indeed, unsuitable.

Dan McKenzie.

REVIEWS.

The Medical Annual. Bristol: Wright. London: Shapkin, Marshall and Co. 1914.

The Medical Annual is with us again and presents its usual instructive and attractive features, but in a slightly more attractive form. The list of contributors is as before a brilliant one and almost the same as last year. The diseases of the Ear are entrusted to Dr. Geo. L. Richards of Fall River, and those of the Nose and Throat to Dr. W. G. Porter of Edinburgh. In both of these departments the most important pieces of work of the past year are abstracted, the scope being all the wider owing to the incidence of the International Medical Congress. Among the abstracts we are pleased to see numerous excellent ones derived from the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, which the readers will desire to study in full in the original. Dr. Richards has, however, given many from American sources, which are more likely to have escaped our home readers. The references will be found of the utmost value. Among the most important otological abstracts are those on the operative treatment of meningitis in which the advances, if steady, are necessarily slow. The abstracts on tinnitus aurium are particularly good. Nasal disease is discussed from all points of view.

Among the newest points we may notice the X-ray photographs of larynx taken by Rethi's method. This consists in placing a narrow plate in the pharynx and hypopharynx while the exposure is made from before backwards. The cesophagus supplies material for some excellent and novel reports. The articles by general physicians and surgeons contain much material of interest to the specialist. Dr. J. J. Perkins on "Tuberculosis," and Dr. Purves Stewart on "Diseases of the Nervous System" offer much of instructive value, while Dr. Langmead's article on the relation between rheumatism and the tonsils will be especially welcomed by laryngologists. The glossary is enlarged and the usual descriptions of new instruments, appliances, and medicaments appear as irresistible as of yore. The list of readers of the Annual ought to be an increasing one, and with such an issue as this, it is bound to be so.

Douglas Grant.

Plain Rules for the Use of Tuberculin. By R. ALLAN BENNETT, M.B.Lond. Charts. Demy 8vo. Pp. 48. Price 2s. 6d. net. Bristol: J. Wright and Sons, Ltd. London: Simpkin, Marshall, etc., Ltd. Toronto: Macmillan Co., Ltd. 1914.

The writer of this work is moderate in his claims for tuberculin and judicious in his recommendations as to its use. His standpoint may be gathered from his statement that in order of excellence he would place first, sanatorium and tuberculin treatment combined; second, sanatorium without tuberculin; third, tuberculin alone. In view of the personal equation as to responsiveness of each patient and the need for experienced clinical acumen in estimating it, the reader who wishes to begin putting the treatment to practical use would, no doubt, wish to supplement his knowledge by the study of some more extensive treatises, but he could scarcely get in the same space so much practical information as this little work focalises. The avoidance of reaction is strongly inculcated, the dosage is very clearly stated, but the reader might wish for a more detailed description of the various forms of tuberculin which are often referred to by their initials. We are sure the "plain rules" will be found most helpful.

Dundas Grant.

Diseases of the Nose, Throat, and Ear. By W. L. BALLENGER, M.D. Fourth edition, revised and enlarged. Pp. 1980 + xi. 536 engravings and 33 plates. London: Henry Kimpton, 1914.

The distinguishing feature of the fourth edition of this excellent work is its chapters on the labyrinth, illustrated with thirteen original coloured plates elucidating the physiological and pathological manifestations of nystagmus. These chapters, however, still fail to give British otologists due mention.

The rest of the work has undergone considerable revision; whether it can be described, as claimed, a "searching" one is a matter of opinion, since Siebenmann still appears as "Siebernann," as we pointed out in our review of the third edition (*JOURN. OF LARYGOL., RHINOL., AND OTOL.*, 1911, xxvi, p. 391). Autogenous vaccines in hay fever, functional tests of hearing, otosclerosis, and other important matters have been brought up to date, and the volume, which is somewhat bulky, and might now be split into two with advantage, is a valuable one.

Macleod Yearsley.

NOTES AND QUERIES.

DR. J. PRICE BROWN (Toronto).

WE regret to intimate that, owing to his withdrawal from active practice, Dr. J. Price Brown, of Toronto, has retired from the staff of abstractors for the *JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY*.

Dr. Price Brown has for many years taken an active part in the work of the Journal, and it is with warmest expressions of gratitude for his support and with sincere wishes for a long and happy life that we bid him farewell.

THE
JOURNAL OF LARYNGOLOGY,
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ON THE PEREZ BACILLUS AND THE ALLEGED RELATIONSHIP OF OZÆNA TO A CERTAIN CONDITION IN THE DOG, AND MORE ESPECIALLY TO DISTEMPER.

BY J. P. MCGOWAN, M.A., M.D., B.Sc., ETC.,
Assistant Superintendent, Royal College of Physicians Laboratory,
Edinburgh.

(*From the Laboratory of the Royal College of Physicians of
Edinburgh and the Ear, Nose, and Throat Department, Royal
Infirmary, Edinburgh.*)

IN 1899, Dr. Fernando Perez (1) described an organism, which he called the "*Cocco-bacillus fetidus ozænæ*," as the cause of ozæna. The characters of his organism, as described by him then, were somewhat as follows: It is a cocco-bacillus, pleomorphic in character, non-motile, staining well with the ordinary aniline dyes, but not retaining Gram's stain. It is aerobic and facultatively anaerobic. It grows well on the ordinary media, does not produce a pellicle on the surface of liquid media, and does not liquefy gelatine. On potato it forms, after twenty-four hours, a yellowish abundant moist layer, free from gas bubbles; it never coagulates milk, often, however, rendering it alkaline; it produces ammoniacal fermentation of urine; and it gives rise, in all culture media, to the characteristic smell of the disease.

It is pathogenic for the guinea-pig, mouse, pigeon, and rabbit. Experimental infection (by intravenous injection) of the rabbit

can be of an acute, subacute, or chronic nature. In all of these three forms, at the beginning of the infection, the cocco-bacillus, of which the virulence is not very great, causes almost always a very intense nasal secretion, sometimes even of a hæmorrhagic nature, quite different from the discharge following the inoculations of any ordinary virulent organism. This organism has, therefore, an undoubted selective action on the nasal mucosa. The principal lesion, *post-mortem*, in such cases is situated in the nasal mucosa, which is very hyperæmic, often indeed hæmorrhagic, and covered with mucus, from which one can recover the original organism. The atrophy, which is the characteristic of true ozaena, Perez claims he can produce experimentally in the rabbit.

During the years intervening since the publication of Perez's paper in 1889, little attention has evidently been bestowed by rhinologists on the claims of this organism to be regarded as the cause of ozaena. In 1913, however, at a meeting of the Berlin Laryngological Society, interest was again focussed on it by a further communication by Perez (2) on the subject. He again describes here the characters of his organisms in much the same terms as he did in 1899. He regards his organism as the cause of ozaena; and from clinical and other evidence comes to the conclusion that this disease is infectious and contagious—not only among human beings, but also from dogs to man. The following are his remarks regarding the occurrence in dogs and the transmission from them of the disease to human beings (*op. cit.*, p. 2413): "But this disease does not affect man alone, for he shares this infection with the dog. This important discovery I was the first to bring to light, but, in spite of my publications on the subject, it has never become widely known. I have, nevertheless, furnished bacteriological and clinical proof of the possibility of this infection.

"The cocco-bacillus, which I have found in ozaena secretions, exists normally in the nasal cavities of the dog; and increases in quantity in animals that are ill with distemper. It causes there pneumonic patches. I have not been able to establish its presence in the nasal cavities of other domestic animals. It is the dog alone and especially the diseased dog which is capable of spreading the disease. This bacteriological finding opens up a new chapter in the epidemiological history of the disease."

"Clinical inquiry concerning the spread of ozaena supports the laboratory findings. In two of my papers¹ I have published a

¹ Perez gives no references in this 1913 paper to his previous communications, so that I have not been able to consult these in the original.

series of observations on the spread of ozaena by the dog. Dr. Slodtchëff writes me to say that he has had a very striking case of such an occurrence; and Dr. Popovici, of Bucharest, has likewise reported a case to me in which without doubt a dog was the cause of the spread. I am convinced that the number of the observed cases in which the infection is due to the dog would be much greater if investigation of the dog as a possible source was carried out more often. I confess that this task would require great patience on the part of the doctor and that it would require the expenditure of some time. Such conditions are difficult to fulfil in hospitals with their press of work. When an isolated case of ozaena occurs in a family, one should consider the possibility of the infections having arisen from some dog."

Perez repeats here his former statement with regard to the effect of the intravenous injection of his organism into rabbits, viz. in acute cases the production of inflammation of the mucous membrane of the anterior turbinates associated with the local presence of his organism, and in chronic cases a chronic inflammatory affection of the same region, with eventual atrophy of the turbinates, a change similar to that occurring in ozaena of the human being.

Hofer (3), working on the subject of ozaena, gives a method of isolating the *B. ozaenæ fort.* from the ozaena crusts by injection of the mixed culture into the ear vein of the rabbit and subsequent recovery of the organism in pure culture from the induced nasal discharge of the rabbit. He obtained slight but not striking agglutination of the organism with the serum of ozaena patients.

Hofer and Kofler (4) found a vaccine made from Perez's organism of use in treatment of the disease. The ameliorated condition obtained subsequent to the use of the vaccine was not in their opinion merely a relief of symptoms, which might occur from many different causes, but was a true vaccinal success, which goes to favour the view that the "*Cocco-bacillus fortidus*" is the cause of the disease.

The present paper does not deal with the question as to whether the "*Cocco-bacillus fortidus ozaenæ*" is or is not the cause of ozaena: but there are certain points which may here be raised in criticism of the position which Perez has taken up with regard to the disease being transmissible from dogs to human beings. Perez has stated (*vide supra*) that he finds his organism normally in the nasal cavity of the dog, and it increases in quantity in animals that are ill with distemper. It causes then pneumonic patches.

It is to be noted here that Perez does not state that these potentially infective dogs are suffering from ozæna. Again, if a large number of cases of ozæna are due to infection of human beings from dogs, one would expect that ozæna would be specially common amongst those who are intimately associated with dogs, such as huntsmen, kennelmen, dog fanciers, etc. I have the authority of Drs. Logan Turner and J. S. Fraser for saying that they know of no such special incidence. Moreover, while one does not doubt that Perez *may* possibly have found his organism in dogs' noses, attention may be directed to the fact that the organism which I have described elsewhere (5 and 6) as the cause of distemper, occurs frequently in the noses of apparently (though not really so) healthy dogs and without exception and in large quantities in the noses of dogs suffering from frank distemper. Also that this organism when examined hurriedly might easily give the impression that it was the same as that of Perez, though it is in reality very different. To illustrate this difference, I sub-join (Table I) the reactions on the same batch of media of three strains of Perez's organism¹: one strain of the distemper organism and one strain (from Krals laboratory) of *B. alkaligenes fæcalis*. (*B. alkaligenes fæcalis* is here included because of its resemblance to both Perez's and the distemper organisms. Its usual text-book reactions are also given.)

Examination of the results set forth in the table will show how easily in a hurried examination the distemper organism could be mistaken for the organism described by Perez as the cause of ozæna. It is only after the growth characteristics of these organisms have been tested in a number of special media that they are seen to be different organisms in reality. Thus, Perez's organism resembles the organism of distemper in being a Gram-negative cocco-bacillus; Perez's organism is always non-motile, while the distemper organism, usually motile, at some stages of its cultivation may be non-motile; on potato, Perez's organism gives a flat, greyish-yellow, slightly moist growth, which might, in a hurried examination, be mistaken for the altogether different and distinctive raised, copper-brown, succulent growth of the distemper organism; in litmus milk, Perez's organism gives a doubtful alkaline reaction, which could, under certain circumstances, but not in a thorough comparison, be mistaken for the marked alkaline reaction with white deposit of the distemper bacillus. The growths of the two organisms on

¹ I am indebted to Drs. Logan Turner and J. S. Fraser, Edinburgh, and Dr. Brown Kelly, Glasgow, for these cultures.

TABLE I.—*Culture, Results, etc., after Four Days at 37° C.*

Strains of Perez's organism.					Text-book reactions of <i>B. alkalifaciens</i> .
Hofer I strain.	Hofer-IIeffi strain.	Dr. Brown Kelly's culture.	Organism of distemper.	Kmls strain of <i>B. alkalifaciens</i> .	
Gram.	Negative	Negative	Negative	Negative	Negative Cocco-bacillus cattle.
Morphol.	Cocco-bacillus	Cocco-bacillus	Cocco-bacillus	Cocco-bacillus	
Motility	Non-motile	Non-motile	Usually motile, some times non-motile	Motile	
Potato	Yellowish; not raised	Greyish; dirty; moist; unraised	Raised; copper brown; moist	Slight growth; dry and colourless	Alkaline.
Litmus milk	Alkaline ??	Alkaline ??	Strongly alkaline; white deposit	No change	
Glucose	Acid ??	Acid ??	Acid	Acid	
Galactose	Acid ??	Acid ??	Acid	Acid	0
Mannite	0	0	0	0	
Agar (slightly inoculated)	In 24 hours flat, easily noticeable greyish colonies	In 24 hours flat, easily noticeable greyish colonies	In 24 hours flat, easily noticeable greyish colonies	In 24 hours flat, easily noticeable greyish colonies	
Glycerine agar . . .	No change in morphology	No change in morphology	Product on of coccal forms	No change in morphology	No liquefaction.
Gelatine	Free growth; no liquefaction	Free growth; no liquefaction	Free growth; no liquefaction	Free growth; no liquefaction	
Broth	Turbidity; no pellicle	Turbidity; no pellicle	Turbidity; no pellicle	Turbidity; no pellicle	
Potato water	Ditto; indol ??	Ditto; indol ??	Ditto; no indol	Ditto; indol ??	Very marked nitrite production
Nitrat. water	Slight nitrite production	Slight nitrite production	Slight nitrite production	Slight nitrite production	
Lactose neutral in l . .	Fluorescence	Marked fluorescence	Marked fluorescence	Turbid, no fluorescence	
Dextrose	0	0	0	0	0
Dextrin	0	0	0	0	
Gum	0	0	0	0	
Reducose	0	0	0	0	0
Maltose	0	0	0	0	
Lactose	0	0	0	0	
Sucrose	0	0	0	0	0
Inuline	0	0	0	0	
Adonite	0	0	0	0	
Inosite	0	0	0	0	0
Sorbit	0	0	0	0	

Interrogation marks mean "doubtful production of"; a cypher means "no change" or "no production of"; while a blank means that there is no record of the reaction.

¹ McCoukey, *Journal of Hygiene*, vol. v, p. 333, vol. ix, p. 86.

gelatine, peptone water, and broth, are much alike with this exception, that while Perez's organism may produce some indol, the distemper organism produces none. On agar, in tubes inoculated heavily, the appearance of both organisms is much the same; but where the tubes are lightly inoculated so that discrete colonies only appear, the mode and rate of growth and the characteristic appearance of the distemper organism colonies can hardly be mistaken for those of the Perez's organism. On glycerine agar, the naked-eye appearances of the growths are much the same, but microscopically, while the distemper bacillus undergoes a marked change in size and shape, no such change is observable in Perez's organism. On a large number of the sugars, the reaction of the two organisms is the same, but whereas Perez's organism produces acid in glucose and a doubtful acid reaction in galactose, the distemper organism produces no change in these sugars. Another very noticeable distinction between these two organisms is their reaction in a lactose medium containing neutral red—for, while Perez's organism produces a very marked fluorescence, the distemper organism produces none.

It will be seen, in passing, that while *B. alkaligenes faecalis* superficially resembles both, a closer examination reveals its differences. As these are not germane to the point at issue, they will not be discussed more fully here. A point has, however, been made of the odour from cultures of Perez's organism. While convinced that it resembles very closely that of ozæna, I am not at all sure that this is a special feature of the organism. The subject of smells is a difficult point to dogmatise upon, but my experience is that the others also have an odour which resembles in some degree that of ozæna.

A further weak point in Perez's argument for the dog being the cause for infection in man is where he states (*vide supra*): "The cocco-bacillus which I have found in ozæna secretions exists normally in the nasal cavities of the dog and increases in quantity in animals that are ill with distemper." In my paper on distemper, already alluded to, I have shown that dogs apparently well and exhibiting all the signs of health, may have the distemper bacillus in their nasal secretions. Such dogs are not, however, in reality well, for their rectal temperature is slightly raised. This, however, is not evident until the special examination has been made to detect it. I have also shown in the same papers that, at certain (early) stages of "frank" distemper, one outstanding feature bacteriologically is the presence, in enormous numbers, in

practically pure culture of the distemper organisms as above described. Perez states that, after the injection of his organism intravenously into the ear vein of rabbits, he obtained a purulent rhinitis associated with the presence locally of his organism in these animals. I have, however, also pointed out that distemper (called "snuffles" or "snifters"), associated with the presence of the bacillus in varying degrees of severity, occurs in several species of animals, including rabbits, which are especially subject to it. In the absence, therefore, of proof to the contrary, one is justified in provisionally assuming that the rabbits used in Perez's experiments were suffering from distemper—it may be in a very mild form—and that cultures made from the nasal discharges, subsequent to intravenous injection, revealed the presence of the distemper organism, which, as one may see, from its cultural reactions given above, may easily, in a more or less rapid examination, be mistaken for the *Bacillus ozaena putridus*. I would, therefore, suggest that before it is definitely accepted that ozaena is a disease of dogs capable of being transmitted to man, the questions arising out of the resemblance of Perez's organism and the organism of distemper should be further investigated. Nothing that has been said in this paper, however, negatives the possibility of ozaena due to Perez's organisms occurring in the dog; but the evidence adduced so far is not convincing.

In conclusion, I wish to thank Dr. Logan Turner and Dr. J. S. Fraser for drawing my attention to the work of Perez, and for valuable help accorded me in other ways.

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CASE OF TRACHEAL TUMOUR.

BY JAMES ADAM, M.A., M.D.,
Glasgow.

At the meeting of the Scottish Oto-Laryngological Society at Glasgow in June, 1914, I showed a case of malignant disease involving hypopharynx and ostium of gullet in which, after symptoms lasting for some years and increasing in severity, the condition cleared up under radium. The case was reported in this JOURNAL, September, 1914, p. 474. It had been seen and treated by many doctors, and at least four of these, from the clinical examination, considered the case to be malignant. Two of them declined to operate; one suggested gastrostomy; one suggested removal of the growth together with a ring of the gullet; this the patient declined. The pathologist's report was that it was definitely malignant. Those who saw the case at the meeting agreed that the result was perfect. The case remains well, though with such a slowly-growing tumour recurrence is likely to be slow, and it is still too soon to claim a permanent cure. The success of radium in this case tempted me to try it in the following case; the result was very different.

A lady, aged forty, was sent to me by Dr. R. S. McKim, of Rutherglen, in January, 1914. She had had slight winter cough for years and a slight tendency to breathlessness on exertion; indeed, there had been symptoms of slight asthma, but diminishing of recent years. From February, 1913, she had what she considered a slight cold and cough; in September she first noticed streaks of blood; in November she got a bad cold and after that had more expectoration—mucus mixed with pns and sometimes with blood—but never really was the expectoration more than in pellets; sometimes small streaks of blood came alone. Nothing abnormal could be found in the lungs; no tubercle bacillus in the sputum; the heart was sound; von Pirquet negative; temperature normal. The general condition was excellent; the patient rather stout and florid. She spoke of a certain feeling of tightness in her chest.

The symptoms suggested a tumour, and I proposed a bronchoscopic examination, but this at first patient declined. As there was an occasional slight clicking *râle* at right apex, Dr. J. R. Riddell was asked to radiograph the chest. He said there seemed to be some thickening in the interlobular fibrous tissue of the right lung, such as he had seen in chronic infection with the pneumococcus.

A tube was passed on February 11, 1914, and a small bleeding tumour could be seen just above the right bronchus. Operation was performed, March 13, under local anæsthesia (eucain and adrenalin), with no pain or hæmorrhage. Mr. R. H. Parry, who had previously seen the case and for whose kind assistance I am much indebted, did a low tracheotomy. The trachea was pulled forward, and a tumour, about the size of half a cherry, with broad base, was seen just above and half obscuring the right bronchus. It felt firm to the touch and suggested malignancy. I removed it partly with snare, partly with punch, and thoroughly canterised the base. As the pathologist's report was "epithelioma with much formation of cell-nests," it was agreed to try radium, but delay occurred owing to a pneumococcal rhinitis. On April 5 I reopened the tracheotomy wound, and Dr. Robert Knox gave the first treatment with radium. She had repeated exposures, the longest being over twelve hours. I have to thank Mr. C. W. M. Hope for kindly looking after my patient till her return home from London in June. She had considerable distress till the reactionary slough came away, then she got a little ease, but the tumour grew again, and the patient died, evidently with metastatic growths, in August. No autopsy. After the second operation a tracheotomy tube was worn until death.

These two cases seem to bear out the growing opinion that radium is most useful in that class of slow, malignant tumours most generally seen in the skin. In connection with the above tracheal case, that recorded by P. Heymann (1) bears some striking points of resemblance. "Because of the slow growth an erroneous diagnosis of bronchial asthma was at first made. Tracheoscopy revealed tumour on anterior tracheal wall to the right of its union with right bronchus. By the direct method a specimen was excised, examined microscopically, and found to be carcinoma. By Gluck's method the whole trachea was removed and prothesis performed after fourteen days, consisting of inserting an elastic drainage-tube which was fastened round the neck. The man (aged twenty-six) is at work." It would be interesting to know the later history of this case.

Ingersoll (2) reports a case of sarcoma of the trachea which died seven weeks after operation, and refers to five cases of malignant tumours of the trachea, all carcinoma (Berens, Kaunitz, Simmell, Eidesheim, Nager), reported since Theisen's very complete paper in 1906.

Theisen (3) says: "Tracheal cancer appears to favour the male

sex; out of the cases collected by the writer, men were afflicted about twice as frequently as women. The youngest patient was aged twenty-eight, the average, however, being from the fiftieth to the sixtieth year. Many more cases occur between these years than between the thirtieth and fiftieth.

"The favourite seats for primary tracheal cancer are the upper parts of the trachea and the lower parts, close to the bifurcation. Although primary tracheal sarcoma is rarer than carcinoma, we have been able to collect eighteen cases from the literature. Both sexes seem to be equally affected with tracheal sarcoma and young people rather more frequently than persons more advanced in years. Occasionally the tumours are pedunculated.

"Tracheal tumours are situated, in the majority of the cases, in the upper part of the trachea. They most rarely occur in the middle. They are attached most frequently to the posterior wall, which is rich in mucons glands. This is particularly true of the carcinomata, which appear to take their origin from these glands.

"The rarity of tracheal tumours becomes much more striking when the eighty-nine benign and forty-six malignant tracheal tumours are compared with 10,747 benign and 1100 malignant laryngeal tumours which Semon collected between 1862 and 1888.

"The malignant tumours of the larynx represent only about 11 per cent. of the total number, while in the trachea, according to the cases collected by the writer, they represent about 50 per cent. of the total. These show that a strong suspicion of malignancy must always attach to a tracheal tumour."

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SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

*May 27, 1914.*Dr. D. R. PATERSON, *in the Chair.*

Epithelioma of the Maxillary Antrum and Hard Palate Three Years after Operation.—E. B. Waggett.—Male patient, aged sixty-five. The growth commenced in the region of the left upper molar roots, and probably originated in a paradental "rest." Six weeks' history of pain and swelling. The growth involved the left antrum, the nose, and both halves of the hard palate. Free removal of the major part of both superior maxillæ in February, 1911. No gland operation; no recurrence. A temporary roof to the mouth was obtained by stitching the cut edges of the velum to the buccal mucosa, and above the imperfect diaphragm so formed a plate of rubber was inserted. The patient was thus enabled to take nourishment in the normal manner from the day of operation, and was out of hospital in eight days. An operculum subsequently was made at the Dental Hospital, Leicester Square, and, with the exception of some lacrymal trouble on one side, the patient has been free from serious discomfort.

Sarcoma originating in the Floor of the Right Maxillary Antrum Two Years after Operation.—E. B. Waggett.—Female patient, aged seventeen. Massive growth filling the antrum but not involving the orbital plate. Invasion of the inferior nasal meatus. The right palatine and post-canine regions occupied respectively by firm elastic prominences. Absence of "egg-shell" phenomenon. Dull nasal pain of some weeks' duration. No ulceration and no epistaxis. Operation in January, 1912, a few days after detection of tumour. The malar eminence, the orbital plate and pterygoid processes retained. No gland operation; no recurrence. A rubber operculum, inserted at the operation, enabled the patient to take nourishment in the normal manner from the first. A prophylactic application of radium produced a painful burn of the tongue and temporary fixation of the jaw. Mr. Turner released the jaw by progressive wedging, and fitted an operculum, which has relieved the patient of any serious discomfort. Dr. Shaw reports the microscopic specimen as sarcoma composed of spindle cells, with fibrous tissue, giant cells and osseous tissue in places.

Endothelioma of the Nose Three Weeks after Operation.—E. B. Waggett.—Female patient, aged seventy-four. The left nose was distended by a soft, friable, opaque white tumour with a nodular surface, bleeding freely on manipulation and exhibiting expansile pulsation. The ascending process, left nasal bone, and nasal septum were displaced, with external deformity. (Specimens exhibited.) History of nine months' nasal obstruction and epistaxis. No pain. Operation, May 7: Manipulation of the tumour after exposure through a lateral nasal incision caused brisk hæmorrhage, and the ascending process was quickly removed in

order to gain adequate access to the unseen bleeding area. The tumour was then readily removed with the finger, and the hæmorrhage at once abated spontaneously. A remnant of the growth was then seen to hang by a broad pedicle from the free edge of the posterior half of the middle turbinate. As the anterior limits of the growth could not be defined, the ethmoidal labyrinth was removed *in toto*, and muco-pus was found in the sphenoid, frontal sinus, and antrum. In all three cases cricothyrotomy was performed, the pharynx plugged, and the tube removed at the end of operation.

The PRESIDENT said this series was a very interesting one, and illustrated with what excellent results these extensive operations were carried out. The exhibitor had shown that the results were lasting. Where success was likely to be unattainable by operation, resort should be made to radium. But it was well to encourage operation in the first place, where that was possible.

Mr. HERBERT TILLEY agreed that Mr. Waggett deserved congratulation on these cases from the operative point of view. In his own student days, if patients came with so-called "malignant disease of the upper jaw," operative treatment used to be considered to be a very serious matter, with almost certain recurrence. He was led to speculate how far in the future treatment by means of radium emanations was likely to minimise the extent of the operative interference. Recently, in University College Hospital, there were two cases of malignant disease of the upper jaw, in which operation was inadmissible, owing to the extent of the disease. As a forlorn hope, two radium emanation tubes, each of 50 mg., were inserted, so that there should be a cross-fire action. In six weeks the disease had disappeared, and there was now nothing to show that the patients were anything but normal people. It made one wonder whether it might not be possible in early cases, by applying radium in this way, to obviate operation altogether. So far, the results were only of two months' duration, and he could not judge of their permanency. The type of disease in each case was columnar-celled carcinoma.

Dr. W. HILL said he had at the present moment under treatment a patient with malignant disease of the antrum and nasopharynx, who by six o'clock that evening would have had four radium tubes *in situ* for forty-seven hours. There was a slight rise of temperature the first night, but since then there had been none, nor evidence of physical disturbance, though the patient was aged seventy-five. One tube of 100 mg. was put through the floor of the palate, a 50-mg. tube was inserted into the antrum by the intra-nasal route, one of the same strength in the nasopharynx in proximity to the left pterygoid region, and a smaller tube towards the ethmoid area, which also was invaded by the disease. One would think that in such a patient the mere placing of four tubes in position would be very disturbing, but the slight rise in temperature the first night was all that happened. There was neither hæmorrhage nor pain. Judging by Mr. Tilley's case, and one under Mr. Graham, and a similar case of his own treated two years ago where the nasopharynx and antrum were involved, we possessed in radium radiation a therapeutic method of remarkable palliative possibilities in cases where a radical operation was contra-indicated either on account of the extent of the disease or the feebleness of the patient.

Laryngo-fissure for Epithelioma of Vocal Cord Nine Years after Operation.—Herbert Tilley.—Patient, a solicitor, on whom

laryngo-fissure was performed nine years ago for epithelioma of the cord, was first seen by me in January, 1905, for hoarseness of five weeks' duration. A small, flat, reddish swelling occupied the middle third of the slightly congested right vocal cord. The latter moved less freely than the left cord. Sir Henry Butlin and Sir Felix Semon agreed that the condition suggested epithelioma, but thought a course of iodide might first be tried. This was done, with no good result. I performed laryngo-fissure on April 26, 1905. Microscopic examination of the growth proved its epitheliomatous nature. The patient is shown to illustrate the satisfactory result of the operation and the excellent voice which enables the patient to address public meetings.

The PRESIDENT considered the result perfect. It showed how completely the disease could be removed by a limited operation.

Sir FELIX SEMON said he had seen the patient previously and again to-day, and thought the splendid result obtained justified the fact that operators in England did not rush to do total extirpation when milder measures sufficed.

Mr. HERBERT TILLEY replied that he had brought the case so that members might hear what a good voice the patient had. His practice as a solicitor brought him a good deal into "company" meetings, where those around him had no difficulty in hearing what he said.

Specimen of Vascular Fibromata removed from Larynx by the Indirect Method since the last Meeting of the Section.—Herbert Tilley.—The larger specimen was situated in the anterior commissure and was as difficult to see as it was to remove, owing to an overhanging epiglottis. The smaller specimen was growing from the junction of the anterior and middle thirds of the right vocal cord. The patient had been twice anaesthetised and an attempt made to remove the growth by the direct method.

The PRESIDENT took it that the case was brought by Mr. Tilley to remove any idea which might have been formed from previous comments that he had abandoned the indirect method.¹

Mr. HERBERT TILLEY said he had brought these specimens to show that he had not given up the indirect method. These two cases came before him within ten days of each other, and were interesting. The larger specimen was in the interior commissure, and only by pulling forward the epiglottis could a vascular, bluish-looking fibroma be seen in the commissure. The patient was brought to him with the idea of discussing the question of general anaesthesia and the direct method. He applied 20 per cent. of cocaine to the epiglottis and larynx to see if it was possible to pass the forceps into the larynx. The forceps were Whistler's, and they immediately closed on to the growth, and he therefore removed it at once. The cases were shown to demonstrate that he was not opposed to the indirect method, and that his attitude in the matter was that of eclecticism.

Prof. KILLIAN said that when he was in New York a case was shown to him which was very difficult to examine, and he was unable to see anything; but along the instrument from Reichert he could see a polyp, very deep in the anterior commissure, and removed it. In some cases it was a very good plan to remove a polyp from the vocal cord direct. There were cases which were particularly suitable for suspension laryngoscopy.

Sir FELIX SEMON said he was glad that Prof. Killian had declared

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., January, 1915, p. 43.

there, publicly, that he still removed the greater number of the laryngeal neoplasms he had to deal with by the indirect method, and he hoped that declaration would be an inducement to junior members not to resort to the newer method to the exclusion of the older. His own early operations dated back to a time long before the employment of cocaine: patients had then to be very laboriously prepared by the introduction of probes, sometimes for weeks, before they became sufficiently tolerant to allow of the necessary operation to be performed. Reference to the *Medico-Chirurgical Transactions* would show that in some cases he had removed growths which were generally believed to be inoperable intra-laryngeally. After some practice he had not found the indirect method very difficult, and he would particularly remark that in not a few cases he had found the growths in the anterior commissure the very easiest of all to remove. He had done this by leaning, with some force, on the lower branch of the forceps against the anterior wall of the larynx. This gave a good deal of help. He devoutly hoped that the indirect method would not become a lost art.

SIR STCLAIR THOMSON, in welcoming Prof. Killian there to-day, said that his too enthusiastic pupils were more *Killianische* than Killian himself. He would repeat what he said at the former meeting of the Section — viz. that neither Prof. Killian nor Prof. von Eicken took up the direct method to operate on the larynx if they could use the indirect successfully. Like Sir Felix Semon, he had found it not impossible to operate in the anterior commissure. During twenty years he had not come across a laryngeal growth in an adult which he had not removed to his complete satisfaction by the old, indirect method. He had more than once recommended Horsford's suture for holding up the epiglottis. Like Sir Felix Semon, he agreed that there was a certain knack in using these things, and many would agree that it would be a deplorable day when Mackenzie's forceps were given up. They had been objected to on the Continent and in America by those who had not used them because they looked clumsy and were at an old-fashioned angle. There was a certain degree of tactile appreciation which could be acquired with these forceps. He had sometimes got hold of a growth, and when the patient made a little movement the sensation told him he had grasped too much, and he had let go and waited, and secured a fresh hold. It was a great thing to have Prof. Killian present to give help concerning the indications, because both methods had their indications.

DR. DUNDAS GRANT endorsed the remarks of Sir Felix Semon, for it was astonishing how easily these growths in the anterior commissure sometimes came into the forceps even when one scarcely expected it; one caught the growth in a sort of antero-posterior grip. He had found Whistler's forceps most useful; there was something extremely convenient about the little double spoons with which the tips were provided. For lifting the epiglottis he pinned his faith to the Mount Blyer lever, which acted on the same principle as the one shown by Prof. Killian. In the case, however, of small children under a general anæsthetic, one had in suspension laryngoscopy an ideal method of dealing with difficulties which had hitherto proved practically insuperable.

MR. CYRIL HORSFORD said he first recommended the use of the epiglottic suture in a little article in 1908, in which he said it was a plea for the survival of the fast-dying indirect method. So he was interested to hear, even six years later, such an interesting discussion on the subject. In a second paper, in which he set forth his later experiences, he illustrated the point by reference to one case, which was a difficult one. It was a

small growth on the anterior half of one vocal cord. Numerous attempts were made, with various instruments, and there were two attempts by the direct method, once under a general anæsthetic. After those he succeeded, by means of the epiglottic suture, in removing the growth in the ordinary way. That showed that these growths were more easily removed by the indirect method, particularly if aided by the suture.

Dr. FITZGERALD POWELL was pleased to note the support that was given to the old methods by such eminent authorities, especially after the onslaught that had been made on the indirect method of laryngeal examination and operation. At the last meeting of the Section much had been justly said in favour of the epiglottic suture in operating on growths in the anterior commissure. He would also like to mention laryngeal forceps introduced by Lambert Lack, and a modification of Mackenzie's forceps by himself, in which the cutting blades of the forceps were turned back towards the operator and enabled him to seize the growth very readily in the anterior commissure.

The PRESIDENT said he also could speak from an experience with Horsford's suture, and he much preferred it to the ordinary epiglottic elevator, because it could, so to say, regulate itself. One had only to attach an artery forceps to the suture and allow it to hang out of the patient's mouth, and that produced enough drag on the epiglottis to lift it up. But instruments differed in individual hands.

Dr. DAN MCKENZIE remarked that what the seniors had said was true, and their remarks had been very interesting, but he feared many of the younger men would go away from the meeting and still do what they had been doing for a considerable time past—namely, remove most, if not all, small tumours in the larynx by the direct method. He, of course, said that with trepidation in the presence of masters in laryngology, but he felt that, in honesty, it was for one of the younger men to give utterance to what he was now saying, for they could look back on a good many tumours, difficult or impossible to remove by the indirect method, which, to their great surprise, they could easily get away by the direct. He would like to repeat one remark which he heard made by a pathologist whose *cliquete* lay largely among laryngologists, that previous to the introduction of the direct method a large number of the specimens submitted for his opinion consisted of healthy laryngeal mucous membrane, but since the direct method was used practically all the laryngeal specimens submitted consisted of pathological tissue.

Case which illustrates the Successful Endonasal Treatment of Unilateral Pansinusitis.—Herbert Tilley.—Female, seen February 7, 1913. Pus found in right frontal, ethmoidal, and sphenoidal sinuses. Duration of discharge probably about eighteen years. Antrum freely opened in Vienna in 1907. Last May I drained the frontal sinus by the intranasal method as outlined at the last meeting of the Section, and also removed diseased ethmoidal cells and drained sphenoidal sinus. The large opening in the latter is very obvious, and the nasal cavities are free from purulent discharge.

The PRESIDENT said the case illustrated very well the points which Mr. Tilley put forward at a recent discussion. Dr. Perry Goldsmith, of Toronto, would show a specimen bearing on frontal sinus conditions.

(a) Two Curettes for the Removal of the Anterior Ethmoidal and "Agger" Cells. (b) A Collection of Foreign Bodies removed from the Lower Air Passages and Œsophagus. (c) Skiagrams

illustrating Foreign Bodies in the Bronchi and Malignant Strictures of the Œsophagus.—**Herbert Tilley.**—MR. TILLEY said he showed these specimens of foreign bodies to-day as a compliment to Professor Killian, so that he might see how much British laryngologists were indebted to him for methods of dealing with these conditions, and that they were not slow to profit by his teachings in this country.

Intranasal Frontal Sinus Operations.—**P. Watson-Williams.**—Patient shown on whom intranasal frontal sinus operation had been performed by the exhibitor's method of anterior entry, the frontal sinus septum being deliberately broken down to afford free communication between the sinuses. Skiagrams were also shown of patients operated on intranasally for frontal sinus operation.

Specimens obtained from a Case of Laryngo-fissure for Epithelioma of the Right Vocal Cord.—**E. D. Davis.**—Patient, a healthy old soldier, aged seventy-six, complained of hoarseness and a sense of obstruction during breathing of nine months' duration. The laryngoscope showed a circumscribed ulcerating growth involving the anterior one third of the right vocal cord and ventricular band, extending on to the anterior commissure, with limitation of movement of the cord. A piece of the growth removed by the indirect method for section completed the diagnosis of epithelioma. There was no glandular enlargement; the urine and sputum were normal. On April 17, with chloroform anaesthesia, the larynx was opened and the growth widely removed with the anterior one-third of the left cord (*see bottle specimen*). With the exception of difficulty of swallowing the patient did well, but on the seventh day after operation he collapsed and died from heart failure. The *post-mortem* specimen of the larynx, with diagram of operation, is shown, also a histological section of the growth. The lungs and kidney were normal, but there was no sign of repair or healing of the larynx.

Sir STCLAIR THOMSON said it was unfortunate for Mr. Davis and for members of the Section that this patient's recovery was interrupted, because the operation was beautifully performed, as was evident from the *post-mortem* demonstration of the larynx. By the diagram Mr. Davis showed exactly how malignant disease of a vocal cord should be removed. He understood that Mr. Davis, after he exposed the larynx, made his incisions round the growth, and he would like to know whether Mr. Davis was satisfied with that, whether there was not much hæmorrhage, and hæmorrhage which was difficult to check, and also whether he did not lose his bearings a little. For the last six years he (the speaker), after splitting the larynx and getting the vocal cords into view, had done a sort of submucous resection, making a periosteal detachment, commencing close up to the laryngo-fissure in front, and undermining the whole part upwards and downwards and right back, until one could not get any further, *viz.*, to the vocal process of the arytenoid. He then clipped the growth below with curved scissors, clipped it above, and round at the back. Mr. Davis had done well to go far beyond the growth posteriorly; he had not only taken off the vocal process of the arytenoid, but also a large part of the arytenoid itself. He asked whether that interfered afterwards with the patient getting rid of his mucus in swallowing, and whether he had to be fed artificially.

Dr. H. J. DAVIS said he did not understand why these patients were not fed by the rectum; there was no necessity to give them water to drink or to feed by the mouth at all. A patient could be kept alive well for

ten days by means of nutrient enemata. After operation of thyro-fissure recently, he gave the patient nothing by the mouth for ten days, and his only complaint was that he felt rather thirsty; he did not complain of hunger. But there must be enough nourishment given in that way to keep up the strength of the patient. When the patient was on his back and was fed by the mouth, some food was very apt to get down into the lung and set up septic troubles, and this is what these patients usually died from.

Sir FELIX SEMON said he had operated on many of these cases, and was the first to advise how the after-treatment should be carried out, after the late Sir Henry Butlin had given his first excellent directions. He had fed his patients from the second day, if not even from the first, by the mouth, but he took care to place the patient in horizontal position on the operated side, with the head hanging slightly over the edge of the bed, when the food was taken, and the nozzle of the feeder was introduced into the dependent angle of the mouth. He had not lost a single patient from septic pneumonia which could be traced to that method, and he recommended those who were beginning these operations to follow it. He also raised the question whether it was necessary to give patients adrenalin at all. He doubted the wisdom of it. An early experience of his was that he had lost a patient from secondary hæmorrhage after the use of adrenalin. No doubt it was nice to be able to do a bloodless operation by not merely cocaineising the larynx, but also giving adrenalin; but in the case he referred to some blood must have got into the lung, for the patient got pneumonia and died from it. He emphasised the advice he gave twenty years ago, viz., to make the first incision round the growth *below* it, so that if there were much bleeding it would not obscure the second semi-circular cut. Otherwise bleeding might so obscure matters that the operator would not be able to tell whether, in his subsequent cut, he had been keeping a sufficient margin of healthy tissue round the growth.

Dr. FITZGERALD POWELL said he was glad Sir Felix Semon mentioned the point about adrenalin, as his own experience confirmed that of Sir Felix. In one or two of his cases there was considerable hæmorrhage before the wound was closed, and in one very bad secondary hæmorrhage, and that was after adrenalin had been used. After realising Sir Felix Semon's opinion, he gave up the use of adrenalin, and had not had a repetition of that trouble. He took care not to close the wound until all the bleeding had stopped. One could get a good view after swabbing with cocaine.

Mr. E. D. DAVIS replied that when he opened the larynx he used a good deal of cocaine and adrenalin. His object was to get the growth from the back, *i. e.* by a deep incision behind the growth, and approach the two incisions forward, above and below. But that he found difficult. He then started to dissect the growth from the thyroid cartilage from before backwards. He then pulled on the growth, and believed he pulled a little too hard, because there was a strip of mucous membrane detached from the aryæno-epiglottidean fold. He afterwards divided the mucosa, aryænoid, and vocal process with scissors. His object was to take the growth from the depths, so that the blood should not obscure his incision at the back. He plugged the larynx above and below before commencing his incision. There was considerable difficulty in swallowing. Twenty-four hours after the operation he gave the patient some sterile water to drink in order to see how he could swallow, but the water came through his tracheotomy wound. He therefore gave up the idea of feeding by the mouth, and passed a nasal tube for the purpose. He was practically fed

by a nasal or œsophageal tube until his death. With regard to removal by indirect method of a piece of growth for section, the pathologist was not satisfied with the amount of growth he received for examination: there was not enough to be sure of its nature.

Gummatous Ulceration of the Larynx.—E. D. Davis.—A publican, aged thirty-eight, was first seen in June, 1913, for hoarseness, stridor, and slight laryngeal obstruction. He had received eight intra-muscular injections of salvarsan and was taking mercury, but could not tolerate potassium iodide. Wassermann reaction positive. Sputum: No tubercle bacilli. A sketch of the larynx at this stage is shown. In spite of two more intramuscular injections of salvarsan the laryngeal obstruction increased, and on August 29 tracheotomy was performed. An intravenous injection of 0.9 gm. neo-salvarsan was given, and subsequently, by suspension laryngoscopy, the excess of granulation tissue was removed by curette and forceps. Rubber tracheotomy tubes were used, and after the curetting, the tubes were button-holed to allow air to pass through the larynx. The patient repeatedly coughed up small sequestra of ossified cartilage, even before any laryngeal treatment was commenced, and on one occasion a sequestrum (the complete left arytaenoid cartilage) was discovered in the button-hole of the tracheotomy tube. (Sequestrum shown.) A second intravenous injection of 0.9 gm. neo-salvarsan was given, and a negative Wassermann reaction obtained ten days later. The tracheotomy tube was removed at the end of ten weeks, when the larynx had healed. The patient is now taking "tablets" of iodide and mercury.

The PRESIDENT said the case illustrated the undesirability of assuming that because a patient had a certain number of salvarsan injections he was necessarily cured of his syphilis. Recently he had a case brought to his notice which had had salvarsan injections, but the Wassermann reaction was negative. An insurance policy was granted by an office for a large amount, on a certificate being produced that his Wassermann reaction was negative. Two years afterwards tertiary manifestations of syphilis had occurred in the form of ulceration of the pharynx, and the Wassermann reaction was positive. The patient also, like Mr. Davis's, was very intolerant of iodide, but he bore the "tablets" of iodide and mercury very well, and the ulceration rapidly healed under treatment.

Gummatous Perichondritis.—E. D. Davis.—A woman, aged twenty-eight, complained of hoarseness and difficulty in breathing for one week. An examination showed considerable swelling of both ventricular bands. The glottis was filled by the swelling, with the exception of a small triangular interval between the arytaenoids. Some thickening of the ala of the thyroid was palpable. Wassermann reaction positive. An intravenous injection of 0.9 gm. neo-salvarsan was given on April 28, with marked reduction of the intra-laryngeal swelling, so that it was possible to give potassium iodide and mercury.

Advanced Laryngeal Tuberculosis treated by Tracheotomy and Curetting.—E. D. Davis.—A cabinet-maker, aged thirty-nine, who had been treated at Mount Vernon Hospital for pulmonary and laryngeal tuberculosis, developed laryngeal obstruction requiring tracheotomy. The glottis was filled by granulation tissue arising from both ventricular bands and from the inter-arytaenoid region. Tracheotomy was performed three months ago with morphia and scopolamine, and a local anæsthetic

of eucaine and adrenalin solution, 4 per cent. At a later date the granulation tissue was removed with forceps and a straight Heryng's curette with suspension laryngoscopy. The patient has received small doses of tuberculin.

Mr. E. D. DAVIS, in reply to the President, said the patient had very advanced pulmonary tuberculosis, and the tracheotomy became imperative owing to the patient's dyspnoea, restlessness, and the inability to sleep at night. Though the larynx was now fairly free it would be inadvisable to leave out the tracheotomy tube.

Specimen showing Absence of both Frontal Sinuses and Fronto-nasal Ducts.—Perry Goldsmith.—Dr. GOLDSMITH said the specimen he had to show might not be so unusual to members of the Section, with their large experience, as it was to him. He had every reason to think that the skull shown was that of a Canadian Indian, and there was a complete absence of both frontal sinuses and fronto-nasal ducts. The absence of one frontal sinus was not unusual. In the usual position for the fronto-nasal duct there was no communication whatever.

Dr. DONELAN asked whether Dr. Goldsmith could communicate any points about the history of the case, as the specimen reminded him of a case he (Dr. Donelan) had shown here, in which a previously operated frontal sinus was found filled up with bone when an attempt was made to reopen it a year later. This specimen looked as if pre-existing sinuses had become filled up as the result of disease or trauma.

Dr. PERRY GOLDSMITH replied that he was sorry not to be able to give any points in the history, as the possessor of the skull had been dead probably four or five hundred years. He was not prepared to dispute the suggestion that in this case also there had been osteo-myelitis. But he had gouged away the diploë, and there was no suggestion of any communication, nor anything which anyone, even in his most enthusiastic moments, could call a high ethmoidal cell. He expressed his pleasure at having been privileged to be present at the meeting and to participate in it.

? Malignant Disease of Larynx.—Dan McKenzie.—The patient is a man, aged forty-two. He came to hospital complaining of a pain in the right side of his throat "as if a tooth-brush bristle was sticking into it." In the larynx some irregular papillomatous outgrowths were seen in the interarytænoid region rather towards the right side. Both cords were red, and the movement of the right cord distinctly unimpaired. There was also visible a small ulcer involving the posterior end of the right cord; and the interarytænoid region, especially on the right side, showed considerable infiltration and swelling. There is no history of lues, and the Wassermann reaction is negative. Portions of tissue have been removed by the direct method for microscopic examination, the result of which will be reported at the meeting. The patient has a large soft goitre.

? Tertiary Infiltration of the Larynx simulating Malignant Disease.—Dan McKenzie.—The patient is a male, aged fifty-six. The larynx shows general nodular outgrowths and bosses in the region of the left ary-epiglottic fold, the left ventricular band, and the posterior part of the left cord. Here also some ulceration is visible, and the movements of this cord are distinctly limited. The condition is most easily seen on direct examination in Mouret's position. The Wassermann reaction is doubtfully positive.

Dr. DAN MCKENZIE said the first case had been proved definitely to be tuberculosis. With regard to the second case, the microscopical examination showed giant cells, but the pathologist hesitated to diagnose tubercle, and equally hesitated to say it was syphilis. There were no signs of endarteritis.

Dr. DUNDAS GRANT said this kind of horn-shaped outgrowth was more common in tertiary syphilis than in connection with any other disease. He presumed it was not an artefact condition produced by energetic use of the forceps, and was most probably syphilitic.

Piece of Rabbit Bone removed from Larynx by Suspension Laryngoscopy.—**Dan McKenzie.**—The patient is a girl, aged two, who came to hospital with severe laryngeal stridor. About three months ago the child suddenly seized a piece of rabbit flesh from its mother's plate and bolted it. Asphyxia at once set in, but a neighbour woman contrived to hook the meat out of the child's throat with her finger. Immediately afterwards the breathing became perfectly natural and the child seemed to be quite well, but the next morning laryngeal stridor had developed, and the mother took the patient to a hospital. Since then the child had successfully weathered an attack of bronchitis, although the laryngeal obstruction remained unchanged during the whole of that time. During this illness ordinary swallowing was found to be impossible, and the child was fed by a nasal tube.

The conclusion arrived at by the exhibitor was that while the rabbit flesh had been removed probably a bone had been left behind, and on that assumption tracheotomy was performed without an anæsthetic, as the breathing was very much obstructed, and then the interior of the larynx was searched under suspension laryngoscopy. It was impossible to see any foreign body, and a difficulty was experienced with the epiglottis, which kept falling back and for this the epiglottic retractor furnished with the suspension laryngoscopic apparatus seemed to be of no value whatever. However, by means of a long probe the epiglottis was held up with the one hand while the forceps were passed with the other. After one or two vain attempts, in the course of which the rough grating of a foreign body could be felt about the neighbourhood of the glottis, the foreign body was seized with the forceps, rotated gently to free it from its connections, and removed.

The tracheotomy tube was removed a few days later, and the patient discharged from hospital well.

Osteomyelitis of the Superior Maxillary Bone and Maxillary Antral Suppuration in a Child, aged eleven months at the time of Operation.—**W. Stuart-Low.**—The child was sent to the hospital as an urgent case from the Royal Ophthalmic Hospital, where it had been taken as an eye case. The eyelids were greatly swollen, and presented the appearance seen in cavernous thrombosis. A free incision was at once made on the face underneath the eyelid, and a quantity of pus evacuated. Another incision forty-eight hours after was made in the gingival fold and some pus found. On reflecting the cheek carious bone was discovered and scraped away; this was twice repeated with good results.

Dr. BROWN KELLY said this condition was at one time called empyema of the antrum in infants. Some years ago he wrote a paper¹ on the subject, pointing out that the antrum in infants was very small, while the

¹ *Edin. Med. Journ.*, 1904, n.s., xvi, pp. 302-15.

dental sac of the first molar was comparatively large. Judging from the published cases, and the three or four he had met himself, it would appear that the disease was due to a primary inflammation of the dental sac of the first molar, caused by traumatism or infection, which subsequently extended to the superior maxilla.

Large Spindle-celled Sarcoma of Naso-pharynx in a Child.—W. Stuart-Low.—A girl, aged five. Removal by operation six weeks ago. Specimen and microscopic slide also shown.

The PRESIDENT said the removal had been very successful. Mr. Stuart-Low had stated that the pathologist had reported it as a large spindle-celled sarcoma.

Dr. DUNDAS GRANT said this was one of the conditions which simulated adenoids. A number of years ago Mr. Waggett reported that he had found that sarcoma in the naso-pharynx was of more frequent occurrence than was generally supposed. He would like to know whether that experience had been continued to the present time, or was founded on such a series of coincidences as was met with from time to time in medicine.

Mr. WAGGETT, replying to Dr. Grant, said that when he made that remark he had had three similar cases in a fortnight, but that his experience of late years had not confirmed his early impression.

(?) **Rhinoscleroma.—J. Dundas Grant.**—The patient, a man, aged thirty-two, complains of discomfort in the throat and obstruction in the nose of eight months' duration. The fibro-cartilaginous portion of the nose has gradually swollen, and it now feels as if infiltrated with hard paraffin. There is a deflection of the septum to the right, an irregular softish thickening on the left, and a soft fibrous outgrowth half-way back. The roof of the soft part of the nose is covered with a shiny varnish of sticky mucus. The soft palate is thickened and the upper part of the posterior pillar attached to the posterior wall of the pharynx by a fine cicatricial adhesion. The edge of the right half of the palate is the site of pale papillated ulceration: the finger, introduced behind the palate, feels a dense resistance as if the tissue were infiltrated with a substance of the density of hard rubber. The larynx is irregularly thickened and presents some of the appearances of tuberculosis. The obstruction to laryngeal respiration is only slight. There is a considerable amount of inspissated sticky secretion. There are no signs of tuberculosis, and bacilli are absent. Wassermann's reaction has already been taken and found negative. The patient is a Russian from the province of Minsk, and has been eleven years in this country. His wife and children are in good health. The outgrowth from the left side of the septum is at present being cut for microscopical report, and a culture is being made from a scraping from a fresh cut surface.

The PRESIDENT said the case reminded him of one or two he had seen in Stoerk's clinic in Vienna years ago.

Dr. BROWN KELLY thought that the case was rhinoscleroma.

Carcinoma of Maxillary Antrum; Operation and Removal of Glands.—W. M. Mollison.—E. C.—, aged forty-four, attended Guy's Hospital in December, 1913, complaining of bleeding from the left side of the nose for four months. She had been in an infirmary for three weeks on account of the bleeding, but left there one month previous to her attendance at Guy's. She had considerable pain in the left side of the face and about the left eye and in the temporal region; there was

some tenderness over the superior maxilla. She had wasted "very much." On examining the nose there was much obstruction on the left side, and this was seen to be due to a pinkish mass resembling granulation tissue which appeared to come from the region of the middle turbinal. There was some pus about the granulations, and some septic teeth in the upper jaw. A provisional diagnosis of carcinoma was made and confirmed by the microscopical examination of a piece removed from the nose. Operation was performed in January of this year. Moure's incision was made, and the cheek turned down, thoroughly exposing the maxilla. The growth was found to have broken through the anterior wall of the antrum, and to have invaded the tissues of the cheek. The anterior wall of the antrum was entirely removed, and the cavity found full of growth, but, as far as could be seen with the naked eye, the bone itself was not invaded on the floor or roof. The lining membrane stripped off well. The whole of the outer wall of the nose was removed, and the ethmoid as high up as the cribriform plate. Recovery was uneventful. The operation was greatly facilitated by the administration of ether by intratracheal insufflation, there being no anxiety in regard to blood passing into the larynx. About six weeks later a second operation was performed to remove the lymphatic glands from the left side of the neck. Unfortunately the wound became infected through saliva running over the chin, and extensive suppuration followed; however, owing to the most painstaking attention of her dresser, it eventually healed well. Microscopically the glands proved carcinomatous. As a result of the operation the patient is much improved; she has lost her pain, and at present has no recurrence, though, of course, it is only a short time since operation.

The PRESIDENT said Mr. Mollison was to be congratulated on the excellent result in this case, and asked whether he was satisfied that the administration of the ether by the intra-tracheal method was suitable for such cases. Did that method block up the larynx entirely, and prevent blood entering?

Dr. PETERS asked whether the intra-tracheal administration of ether was effective in this case to check entry of blood in the trachea.

Dr. H. J. DAVIS said that at his hospital Dr. Phillips had given these patients rectal injections of oil and ether, and did so now for practically every case of bronchoscopy. Children particularly went under it very quickly. The injection was given *per rectum*. On one or two occasions the injections had been made into the buttock, but they were painful, whereas the rectal injections were painless and acted excellently. The child was partly anaesthetised first, and then the rectal injection was given, and the oil massaged up into the colon.

Mr. MOLLISON replied that the intra-tracheal use of ether was the feature of the operation, and made it much easier than it would otherwise have been, though he quite agreed with Mr. Waggett that these operations sometimes looked more formidable than they turned out to be. The intra-tracheal insufflation of ether prevented the possibility of any blood passing into the trachea, as the air and vapour were driven in and escaped from the larynx under slight pressure.

Localised Hyperostosis of the Right Superior Maxilla.—W. M. Mollison.—P. J.—, aged nine, attended Guy's Hospital on May 5, 1914, complaining of swelling of the right cheek and right-sided nasal obstruction, noticed for the last four months. There is swelling of the nasal process of the right superior maxilla; this feels bony. There is complete right-sided nasal obstruction, and the inferior turbinal is

seen to be the cause of that obstruction. X-ray examination shows "enlargement and abnormal density of the right superior maxilla" (plate shown). The dental surgeon saw the boy, and found three carious teeth, but did not consider these had any connection with the swelling. The Wassermann reaction is "strongly positive." (See Hutter, "Ueber Hyperostosen der Gesichts- und Schädelknochen und die 'Hyperostosis Maxillarum,'" *Monats. f. Ohrenheilk. u. Laryngo-Rhinol.*, 1914, Heft 2.)

Paralysis of both Superior Laryngeal Nerves occurring in the course of Disseminated Sclerosis from Lead Poisoning.¹

—James Donelan.—In view of the great rarity of reports of this lesion the exhibitor has been requested to bring forward the case again on this occasion. The patient shows all the distinctive symptoms, including loss of sensibility of the mucous membrane, the laryngo-thyroid space is unchanged on phonation, the voice is rough, low in pitch, monotonous—the slight change in pitch that can be produced cannot be maintained. The laryngoscope shows that the cords remain slack on phonation: the wavy line can be elicited on gentle phonation, but increased effort blows the cords loosely apart. At first the anterior commissure used to be turned towards the right, the right muscle having been first affected, now it lies in the middle line. On inspiration, the slack cords completely disappear beneath the ventricular bands.

Dr. DAN MCKENZIE asked whether it was an accepted fact that disseminated sclerosis was sometimes due to lead poisoning.

Dr. DONELAN replied that disseminated sclerosis was pre-eminently an intoxication neurosis affecting chiefly young adults. The infectious fevers were a common cause, and he believed that Oppenheimer had reported twenty-eight cases in which a large proportion had been traced to the influence of lead, zinc, or copper. Part of this man's work was to clean the type cases at a printer's, when he probably inhaled the lead-bearing dust. The fact that "dropped wrist" was not present was made a good deal of in the Court when the case was tried. The necessity of dropped wrist was an old-fashioned view which had its origin at a time when the potteries and house-painters furnished most of the cases in this country. The special tendency to wrist-drop in these callings was now looked on as favoured by the excessive stimulation and blood supply of the overworked centres concerned. The more accurate study of lead poisoning in the last twenty years had shown that the paralyses took the most varied forms, and that neither the blue-line on the gums nor the wrist-drop were any longer to be regarded as essential or characteristic symptoms.

Instruments for Submucous Resection of the Nasal Septum.

—James Donelan.—(1) Operating specula for septal or pituitary work. Self-retaining and capable of being fixed in the desired degree of dilatation. (2) Combined knives and blunt dissectors, to avoid as much as possible changing instruments during operations. (3) Modified Ballenger swivel knife. The sides of the fork are prolonged as guards so as to diminish the risk of catching in the mucosa when the area of operation travels outside the limits of the speculum. As blades are so often blunted by the osseous portions of the septum they have been made removable. It will be observed that the pivots pass through an oval

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxix, pp. 33, 340.

opening, and that they are hooked in the opposite direction to the line of cut, so that they grasp the margin of the hole in whatever direction the edge may be travelling.

Carcinoma of the Arytæno-epiglottic Fold and Pyriform Fossa removed by Transthyroid Pharyngotomy.—Walter Howarth.—

The patient complained of increasing difficulty in swallowing and a lump in the right side of the neck for five months. Large mass projecting from the ary-epiglottic fold and infiltrating pyriform fossa seen with mirror, and its limits more exactly defined by the suspension method. The growth was removed with a surrounding area of healthy tissue five weeks ago. Preliminary tracheotomy. Large mass of glands removed at a previous operation. Considerable importance was attached to the following points: (1) The mouth was completely cleared of teeth before the operation. (2) After the growth had been removed an attempt was made to cover in the raw surface by undercutting the mucosa in the post-cricoid region and on the region of the epiglottis and sewing over the flaps obtained. (3) The linear incision in the pharyngeal wall was closed with a double layer of mattress sutures and strengthened by layers of muscle and fascia. (4) The patient was fed by a nasal tube for four weeks, although the pharyngeal wounds were quite healed at the end of a fortnight. (5) The tracheotomy tube was left in for three days.

The PRESIDENT said Mr. Howarth was to be congratulated on the result; it was an extensive operation, and was thoroughly carried out. He hoped the exhibitor would be able to show the case again in a year or two.

Mr. WAGGETT desired to join in the congratulation to Mr. Howarth, and particularly on his boldness in leaving the vocal cord on the affected side. He was not aware that a similar case had been shown before the Section.

Mr. HOWARTH, having thanked the previous speakers for their remarks, said that in these cases he approached the growth by the transthyroid route, which was first described by Mr. Wilfred Trotter in his Hunterian lectures at the College of Surgeons. This approach had the surgical merit of giving an admirable exposure of the diseased parts and enabling the surgeon to plan the extent of his operation accordingly. He thought that the main difficulty lay in the after-treatment, and he laid stress on the five points that he had previously enumerated. In the first case the growth was situated on the outer aspect of the ary-epiglottic fold and then spread outwards into the pyriform fossa. It seemed a pity to remove the vocal cord if it could safely be left behind, and in this case the growth was removed with a good margin of healthy tissue. Careful suture of the pharyngeal wall and feeding of the patient for several weeks with an œsophageal tube were very important. The latter point was well brought out in a case of Mr. Waggett's which was shown a short time ago.

PROCEEDINGS OF THE SCOTTISH OTOLOGICAL AND LARYNGOLOGICAL SOCIETY.

Meeting in the Western Infirmary, Glasgow, June 6, 1914.

DR. WALKER DOWNIE *in the Chair.*

(Continued from vol. xiv, p. 541.)

Temporo-sphenoidal Abscess; Mastoid Operation with Exposure of Dura of Tegmen Antri; Absence of Pressure Symptoms; Spontaneous Rupture of Dura; Operation for Drainage; Recovery.—**J. Kerr Love.**—Female, aged twenty-nine, was admitted on April 1, 1914, to the Glasgow Royal Infirmary. Patient complained of pain, and there was great swelling in the soft parts above and in front of, but only slightly behind, the right ear, of a weeks' duration. When patient was a young girl she had attacks of discharge from both ears. These attacks subsided and she was not troubled with them until three months ago, when she became very dull of hearing, and had a constant discharge. She syringed the ears, her hearing returned, and the discharge ceased until the present attack. This came on quite suddenly a week ago, and pain and swelling have remained practically continuous since. Temperature on admission 99.2° F. April 2: Evacuation of pus by curved incision. April 3: Radical operation disclosed dura exposed by previous necrosis of bone. About 11 p.m. patient had two seizures of a convulsive nature, commencing with rigidity of the left hand, then involving the eye. The seizure after a little time became general and then passed off. April 4: Temperature rose at night to 101.2° F.; pulse 120. April 6: Ophthalmoscopic examination showed fundi normal. During the past two days the temperature has oscillated between 98° in the morning and 101.4° at midnight. April 7: Wound dressed and the swelling in front of and above ear in the post-malar region explored again and found to contain pus. Contents therefore drained. Temperature at 12 noon 99° F., a change in four hours from 101.2° F.; pulse 96. April 8: Wound dressed; two drainage openings made in skin, high up on right side of head, in temporo-parietal region. Exploration with sinus forceps exposed the temporal muscle and fascia infiltrated with pus. Area of bare bone found about an inch and a half above zygoma. Temperature: Minimum, 100.2° F.; maximum, 103.2° F.; pulse 100. Culture from pus: *Streptococcus* and *Staphylococcus albus*. Examination from swab: *Streptococcus salivarius*. April 10: Epileptiform seizure. April 15: Temperature 101° F.; pulse, 76; respirations 24. April 18: Temperature 98.5° ; pulse 72; respirations 24; discharge less in amount. April 22: Temperature has remained about 98.5° since last note; pulse 80; respirations 22. Abscess opened up in temporo-sphenoidal lobe with sinus forceps, an already existing sinus in the dura being used. A large quantity of pus was obtained. Drainage tube inserted. The brain abscess had ruptured spontaneously at a date unknown. Progress thereafter was well maintained and the patient recovered.

Endothelioma of the Mastoid.—**W. S. Syme.**—Male, aged fifty-six, came to the Glasgow Ear, Nose, and Throat Hospital in June, 1913, complaining of pain in and behind the left ear, particularly severe at night. Examination showed slight swelling over the region of the antrum, tender on deep pressure. The tympanic membrane was red, but

there was no bulging, perforation, or discharge. At the middle of September he returned. The pain was much more severe, the swelling over the antrum had increased, and he looked ill. There was still no discharge from the ear. The case was looked upon as probably malignant disease of the mastoid, with superadded suppuration. On incising the soft parts pus escaped. An opening was found in the bone leading into the antrum. Through this opening a firm growth protruded, and invaded the surface of the bone in the neighbourhood. It was, as far as could be seen, completely removed with the adjacent bone. The region of the aditus appeared unaffected, and the tympanic cavity was not opened. The pathologist reported that the growth was undoubtedly malignant, of the nature of endothelioma. Three weeks later there appeared to be a recurrence, the piece removed being again reported malignant, though its exact nature was not decided. A more extensive operation was performed, bone being freely removed, exposing the dura in large part. The middle ear was opened up, and an elliptical portion of skin removed. The incision was prolonged into the neck, and the glands removed. One or two of these were about the size of a bean and firm, but on examination were pronounced simple. There has been, so far, no recurrence.

Killian's Frontal Sinus Operation: Some Unusual Features.—
W. S. Syme.—Female, aged twenty-four. Two years ago had operations on the antral and sphenoidal cavities. Since then intra-nasal treatment had been carried out for the frontal sinus disease, but without diminishing the discharge. She complained of frontal pain, and there was tenderness especially over the left frontal sinus. Killian's operation was performed on April 28, on the left side. A large sinus was found, extending almost half way to the external angle, well across the middle line above the right sinus, and fairly deeply. It was full of soft cedematous tissue and purulent material. Beneath the floor of the sinus, and extending further outwards than this, practically to the external angle, was a large fronto-ethmoidal cell, also full of *débris*. The fronto-nasal opening was enlarged, and a large-sized drainage-tube passed into the nose. The wound was stitched in its entirety. The tube was removed in three days and not reintroduced. With the exception of a cellulitis of the eyelid, which lasted two or three days, the patient went on well for a fortnight. She had then a shivering attack, not amounting to a rigor, and the temperature rose irregularly, reaching 102.8° F. There was slight cedema, reaching up to the hair margin, and there was decided tenderness over left side of the forehead. In two days, however, the cedema and tenderness disappeared, and the temperature became normal. Three days later there was another short rise of temperature to 101° F., but otherwise the progress has been satisfactory. Had we here a mild attack of osteomyelitis? The condition had not the appearance of a cellulitis.

Dr. LOGAN TURNER remarked that the wound had been stitched at the operation. Killian, he understood, did not suture at once. Possibly this accounted for the symptoms (temperature, shivering, cedema). He looked upon it as a cellulitis, and not an osteomyelitis. With regard to the fronto-ethmoidal cell, he asked if Dr. Syme had had an X-ray photograph at the outset, and if this showed this cell. It was evident that with such a cell intra-nasal treatment was bound to fail.

Dr. SYME replied that as the symptoms referred to arose a fortnight after operation, during which time the patient's progress was quite satis-

factory, it could hardly have made any difference whether the wound had been closed at once or after two or three days, as he believed Killian did. He (Dr. Syme) always sutured the wound at once. He was inclined to think the patient had had a mild osteomyelitis.

Carcinoma of Ethmoid and Antrum ; Operation ; No Recurrence after five years.—W. S. Syme.—Female, aged forty, first seen in March, 1909. She then complained of nasal obstruction, discharge from left nostril, severe pain over left side of face, and headaches (from which she had suffered for years) had latterly become much worse. On examination the left nasal fossa was seen to be filled with a pinkish mass bathed in purulent material. On puncturing the antral wall by way of the inferior meatus only a small amount of discharge was, however, washed out. The antrum was opened under chloroform by way of the canine fossa. It was found to be full of a firm growth, which appeared to grow from the nasal wall (probably it began in the ethmoid). The nasal wall was completely removed, the ethmoid thoroughly curetted, and the sphenoidal sinus opened up. The pathologist reported that the growth was actively growing carcinoma. Subsequently on several occasions cedematous tissue was removed, but this proved to be non-malignant. There has been no sign of recurrence for three years or more, and the patient is in good health.

Myxomatous Disease of the Maxillary Antrum.—W. S. Syme.—Female, aged twenty-eight. The history was that of ordinary antral disease with recurring nasal polypi. Frontal headache, nasal discharge, asthma. On lavage of the antral cavities there was only a very small amount of purulent discharge evacuated. On operation both antral cavities were found to be filled with a pearly, exceedingly sticky, elastic material. The cavities were cleared out with difficulty. The external wall of the left antrum was found to be deficient in two places. The pathologist reported that the material was very difficult to examine, but was probably pure myxoma.

Dr. BROWN KELLY said he had seen the antrum full of very tough mucus.

Dr. SYME replied that that had occurred to him, but it was not like mucus. The striking point was that the wall of one antrum was partially destroyed, which was not at all common, in his experience, in association with ordinary antral disease. In myxoma it might occur. The pathologist thought it was pure myxoma, but a myxoma was a very difficult thing to get sections of.

Tuberculous Glands in the Anterior Mediastinum ; Operation.—T. K. Dalziel—The sternum was removed, a small portion of the upper part being left to maintain the shoulder girdle. The base of the heart and the large blood-vessels were exposed and a large tuberculous abscess found beneath the arch of the aorta. Tuberculous material to the amount of about half a pint was removed to the great relief of the patient, who appeared previously to be *in extremis*. Exhibitor referred to two other similar cases on whom he had operated with satisfactory results.

Squamous Epithelioma of the Hypopharynx.—H. Whitehouse.—The patient, a woman, aged thirty-nine, has an irregular ulcerated mass behind the larynx. The cords are fixed and the ulceration is spreading to the anterior region. The pathologist reported on piece removed that it was a squamous-celled epithelioma. The glands are involved on the left side.

Dislocation of the Arytæmoid, probably Congenital.—**W. S. Syme.**—Dr. SYME demonstrated this case by means of suspension laryngoscopy. The patient is a woman. On exertion she makes a crowing noise, and she has always done so as far as she recollects. The right cord is fixed outside the middle line and the arytæmoid is tilted so that the soft tissue above it lies across the opening into the larynx. On phonation the left cord crosses the middle line to meet the right, and the left arytæmoid eminence goes behind the overhanging portion of the right. The voice is not affected.

Specimens, etc.

J. Walker Downie.—(1) Specimen and photograph of epithelioma of auricle from a man, aged seventy-six. (2) Specimen showing extensive epitheliomatous ulceration of the larynx of a man, aged forty-seven. (3) Pedunculated growth from right tonsil in a woman, aged twenty-five, which gave rise to considerable pharyngeal irritation and distress. The histological report by Dr. Shaw Dunn is: "The tumour has the structure of a somewhat oedematous simple fibroma."

J. Galbraith Connal.—Microscopical section of soft papilloma from external auditory canal. The growth was removed from the meatus of a man, aged forty-three. It was attached at the junction of the floor and posterior wall. His only complaint was dulness of hearing. Pathologist's report (Dr. Haswell Wilson): "This is an extremely cellular soft papilloma. There is no evidence of malignancy."

W. S. Syme.—(1) Papilloma removed from posterior end of nasal septum. (2) Antro-choanal polypus still attached to antral lining membrane to show the mechanism of production. (3) Wall (partly bony and partly cartilaginous) of large cyst of middle turbinate which completely filled one nasal fossa, causing marked expansion of it and atrophy of adjacent ethmoidal cells.

Abstracts.

PHARYNX AND NASO-PHARYNX.

Bryant, W. S. (New York).—The Involution of the Naso-pharynx and its Clinical Importance. "Amer. Journ. Med. Sci.," July, 1914.

The author looks upon the naso-pharynx as the "gateway of almost all human diseases" and attributes its vulnerability to three causes: Man's assumption of the upright position, the growth and development of the brain, and the retrograde metamorphosis of the nose, face, and teeth of man.

The assumption by man of the erect attitude has rendered necessary a change in the attachment of the vertebral column from the posterior to the inferior aspect of the skull. This, together with alteration of the base of the skull due to the increase of the brain and diminished development of the facial bones, has so affected the relations of the parts, that while in quadrupeds they form a straight continuous tube, in man the naso-pharynx is bent to a right angle. This angle is a "dead" space and is left unprotected because of its configuration. "Since the vertebral column has pushed forward and the hard palate has pushed backward, the naso-pharynx has lost the power which it had in quadrupeds of contracting and clearing itself by peristaltic action." Moreover,

the well-developed ciliated epithelium present in quadrupeds in this situation is, in man, replaced for the most part by squamous epithelium. Foreign particles inhaled through the nose easily become arrested at the naso-pharyngeal angle and owing to absence of peristaltic action and ciliated epithelium, are with difficulty removed. A partial protection only is afforded by the naso-pharyngeal tonsil.

A list is given of diseases whose infective agent is believed to enter by way of the naso-pharynx. *Thomas Guthrie.*

Kenyon, Elmer L.—**The Nasal Voice with Reference to its Bearing on the Practice of Rhino-Laryngology.** "Annals of Otology, etc.," vol. xxii, p. 1110.

The author considers that the rhinologist is very liable to error in diagnosis, treatment and prognosis where nasaling is the disturbance in question, unless he is able to diagnose the manner of production and cause of the alteration of the voice in each particular case. He should be on his guard for functional nasaling from causes following operation for adenoids, otherwise operations unnecessary and harmful may be done. Operations on the nose or naso-pharynx for nasal voice should not be undertaken until a clear understanding of the cause of the nasaling has been arrived at. A defective palate, when due to congenital partial cleft, serves in large measure to reverse the ordinary indications for operation for nasal or naso-pharyngeal occlusion, and unless the voice indications are carefully followed serious and permanent injury to the speech may result from such operations. *Macleod Yearsley.*

LARYNX.

Behr, Max.—**Primary Laryngeal Actinomycosis.** "Zeitschrift für Laryngologie," Band vi, Heft 6.

Up to the present time 215 cases of actinomycosis of the head and neck have been recorded, 13 cases affecting the tongue, and 173 affecting other organs. Only 4 or 5 cases of laryngeal actinomycosis are on record. Behr's case is as follows:

Male, aged forty-nine, alcoholic. Complained of pain in the neck and swelling for five or six months; orthopnoea was present. The cervical swelling was very hard, and filled up the anterior triangle. The soft palate and uvula were oedematous. The larynx was displaced to the left and also rotated, while the aryepiglottic folds were swollen and congested, and hid the vocal cords. The patient's temperature was 40° C. and the pulse 124. Swallowing and speaking were very difficult. Behr at first thought the case one of malignant tumour and advised immediate tracheotomy. This, however, was not consented to, so the oedematous areas were scarified. Three weeks later there were signs of a superficial abscess over the thyroid cartilage. Incision evacuated foetid yellow pus, containing no tubercle bacilli. A general surgeon was now consulted and he suggested that the case might be one of actinomycosis and advised the administration of potassium iodide. Later on a second abscess was opened and the Ray fungus recognised. Two months later the patient coughed up part of his hyoid bone and the lateral wall of the pharynx was found to be ulcerated. Death occurred about one year after the beginning of the illness. Behr calls attention to the fact that the patient had much to do with horses. He considers that the case was one of primary actinomycosis of the larynx. *J. S. Fraser.*

EAR.

Ferreri, Gh.—Critical Notes on the Treatment of Chronic Suppurative Otitis. "Arch. Internat. de Laryng.," May-June, 1914.

The author confines his remarks to the tympanum and attic.

The course of otitis media is influenced by the surrounding bone, whether diploëtic, pneumatic, or sclerotic. In the pneumatic types, the character is the same as that normally seen in a seven months foetus in the outer attic wall, *i. e.* the squama; in fact the squama at the level of the tegmen tympani may be almost transparent. In such skulls otitis media is refractory to cure by intra-tympanic methods. The author points out that in speaking of sclerotic types, we must not include otosclerosis secondary to chronic otitis media. The distance from the stapes to the roof of the attic is influenced by the inclination of the squama to the petrous bone; so that the upper surfaces of the other ossicles may be either in contact with, or widely separated from, the attic roof.

The author makes an inexplicable suggestion, that as age proceeds, the antrum, as a result of arrested development, may be found at an abnormally low level. A more intelligible variation which he cites is the occasional abnormally low level of the squama, narrowing the vertical diameter of the tympanum as distinct from the attic, and making the latter inaccessible from the meatus.

As regards the removal or conservation of the ossicles when operating, when the opposite ear is deaf, and Gellé's sign positive on the side to be attacked, the removal of the ossicles may make a grave difference to the total power of hearing.

From detailed and illustrated histological data, the author concludes that all inflammatory lesions of ossicles finally end in complete necrosis, despite evidence of attempts to regenerate.

Stacke conserved the ossicles when he found the tympanum healthy, but cholesteatoma of the attic, antrum, or aditus. But the author doubts whether, in such cases, the mere macroscopic appearance of healthy ossicles implies useful function.

In testing the hearing, the micro-telephone is preferable to musical instruments, because the perception of the voice and of musical sounds are such utterly different things.

Experiment has shown that mobility of the stapes is essential for the appreciation of pitch.

The "conservative" radical operation is fraught with most of the same disability as the radical.

The author holds a brief for ossiculectomy, with or without attic resection. He mentions two useful confirmatory tests for tuberculous otitis media:

(1) Inoculation of a rabbit's peritoneum from the lymphatic gland which lies over the mastoid.

(2) The blackening of a strip of gauze soaked in dermatol (bismuth subgallate), due to hydrogen sulphide liberated by the tubercle bacillus.

In otitis media secondary to atrophic rhinitis, the ossicles are found intact, the suppuration being limited to mucous membrane. As regards re-infection from the naso-pharynx, a normal Eustachian tube does not carry this infection. But post-nasal rhinitis damages the salpingo-pharyngeus, thus reducing the mobility of the tube-mouth; then organisms travel up. The pharyngeal tube-ostium may be sealed by injecting caustic fluids into the middle ear.

Finally, the disease should be attacked *via* the external meatus in all cases:

- (1) When there is retention of pus in the attic.
- (2) With caries of ossicles and outer attic wall.
- (3) Of chronic otitis media limited to the soft tissues.
- (4) When there is post-suppurative adhesion of the membrana to the promontory.

H. L. Whale.

REVIEWS.

Diseases of the Labyrinth. By ERICH RUTTIN. Authorised translation by HORACE NEWHART. London: William Heinemann.

A review of this monograph in the original appeared July, 1913, in this JOURNAL, to which survey little can be added except by way of emphasising the very favourable impressions there set forth. The most practical foundations on which the treatise is based must ensure for it always a definite position in all future classics on this subject; and the contents of Chapter I may be well recommended, in addition, to the student of pure physiology who wishes to grasp the more advanced details connected with the functions and phenomena of the labyrinth.

It is with great pleasure that one is able to state that the book has not lost by translation, which has certainly been carried out with great care and accuracy, and must represent a large amount of laborious work and patient toil to overcome the difficulties with which every translation is attended. The only item which does not appear to have been quite clearly represented is the rather important "table" on p. 39, in which the symptoms associated with various forms of labyrinthitis are arranged—here the data under the column referring to nystagmus are not quite happily expressed, although the intention will be gathered with a little care. This, however, constitutes a very small fault, and the translator may certainly be congratulated and is undoubtedly entitled to the thanks of all the English-reading public interested in these subjects.

As further commentary on the original a minor point may be noted concerning Ruttin's separation of that labyrinthitis which occurs in association with acute middle otitis—"serous induced labyrinthitis"—from the other affections of the labyrinth. It is not quite clear why this should be regarded as essentially different from some forms of serous labyrinthitis the result of chronic middle-ear disease, and if such separation really serves any useful purpose either for the clinician or from an academic point of view. One hesitates very much to criticise so high an authority, but it would seem that this condition might well have been included in his "diffuse serous secondary labyrinthitis."

Otherwise one has nothing but praise for the work, either in the original or the English version, which should be a very great help indeed to the student of otology and, as a trusty guide in the hands of the operator, be a means of saving many lives.

Alex. R. Tweedie.

Development and Anatomy of the Nasal Accessory Sinuses in Man. WARREN B. DAVIS, M.D., Philadelphia.

This is a contribution of some anatomical value, founded on the study of 290 lateral walls, of which 202 post-natal included more than 70 between the ages of birth and puberty. The earliest specimens are from embryos of the third month, in which the cells and sinuses are not yet indicated, although the general cavities of the nose are formed. The subsequent development is clearly described: a good diagram might render this account even more clear for those who are neither anatomists nor specialists. Schæffer's nomenclature is used for the conchæ, and

the customary English grouping of the cells is not employed, but there is no possibility of confusion in the description. It may, however, be permissible to remark here that, in addition to Killian's *erste Hauptmuschel*, there are only two primary ethmoidal conchæ, on which the others appear subsequently. Terminological recognition of this ontological fact would have obviated the differences seen in the labelling of Figs. 15, 16, and 22.

The anatomy of the sinuses is given shortly and clearly, the important points being well brought out; no mention is made of the observations of Underwood and Gruber on the antrum.

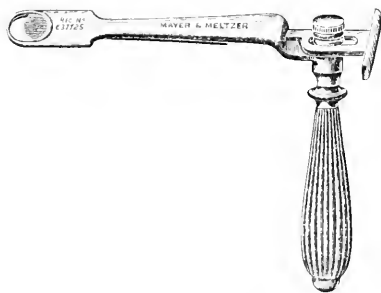
An excellent and interesting little book, simply and lucidly written, which gives clear-cut mental pictures of its subject to the reader. The illustrations are admirable.

J. Ernest Frazer.

NEW INSTRUMENTS.

THE drawing illustrates an instrument that I have had made for me by Messrs. Mayer & Meltzer for the removal of tonsils after the method of Sluder, of St. Louis, and that employed by Pybus and Whillis, of Newcastle-on-Tyne.

The following are the chief points to be noticed in the guillotine: (1) It is well balanced, light in weight, and the shaft is strong and unyielding. (2) Except for a shorter length, the bulk of the instrument differs little from that of the old Mackenzie guillotine. It can be introduced easily into the smallest mouth, and its length and size make it especially useful for rapid work under short anaesthesia. Its length is $5\frac{3}{8}$ in. with the blade closed, and 6 in. with the blade withdrawn. (3)



The handle provides a firm grip and is fixed at right angles to the shaft. This angle does not interfere with the technique of the operation; it allows of sufficient leverage, and the thumb can be more readily placed on the end of the blade shaft to push it home than in a guillotine where the handle forms an obtuse angle to the shaft. (4) The blade lies on the inner side of the shaft, thus throwing the cutting edge slightly more outwards when the tonsil is engaged than is the case when the ordinary Mackenzie guillotine is used in the same way. It is fixed to the top of the handle by means of a screw and rubber washer, and when the screw is taken out the blade with its shaft can be easily removed. (5) The cutting edge is rounded and dull, and the blade is bevelled on its inner side, thus assisting in the separation of the tonsil capsule from the subjacent tissues. (6) The ring may be made in three sizes; its distal rim is narrow and readily passes between the tonsil and posterior pillar.

WM. SANDERSON, M.B., Ch.B.
(Liverpool.)

BOOKS RECEIVED.

Transactions of the Thirty-sixth Annual Meeting of the American Laryngological Association, May, 1914.

A Text-book of the Diseases of the Nose and Throat. By Jonathan Wright, M.D., and Harmon Smith, M.D. Illustrated with 313 Engravings and 14 Plates. London: Baillière, Tindall & Cox. 1915.

THE
JOURNAL OF LARYNGOLOGY,
RHINOLOGY, AND OTOTOLOGY.

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NOISE-DEAFNESS AND ITS PREVENTION.

THE present issue of the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, contains a seasonable article upon the above subject written by Dr. Ritchie Rodger, of Edinburgh. This article, as it happens, is the first of the present year's series of reports from Dr. Logan Turner's clinic at the Royal Infirmary, Edinburgh, and we should like to take this opportunity of publicly expressing our deep indebtedness to Dr. Logan Turner and his fellow-workers, for a regularly recurring series of important contributions to the literature of our speciality, unsurpassed by any other school of workers in this country.

Noise-deafness, as recent contributions and *communiqués* in the medical and lay press have shown, has of late come to assume a natural but unusual degree of prominence and importance from the fact that the hearing of those exposed to the detonation of artillery, whether on sea or land, is temporarily and, in some cases, permanently injured to a more serious extent than during ordinary gun-practice in times of peace.

From the purely scientific point of view, Dr. Ritchie Rodger's work speaks for itself, as is shown by the fact, elicited by him, we believe, for the first time, that noise-deafness is characterised by a loss of hearing for low, as well as for high tones.

At the moment, however, it is to the treatment that we turn with the greatest interest, and in this connection we should like to

lay stress upon a remark made by the author that meatal plugging, in spite of the doubt which has been thrown upon it, does afford a considerable protection to the hearing; the only difficulty, indeed, has been to induce workmen exposed to harmful noises to avail themselves of this simple preventative measure.

According to one of the daily newspapers, a Committee has been recently appointed by the Admiralty to investigate gun-deafness, and that Committee is now, we are told, pursuing its labours. This action is commendable, but somewhat belated, as the matter was brought before the authorities, to our knowledge, some six or seven years ago, probably on more than one occasion, and from more than one quarter.

Not that the Admiralty and other Government Offices have been altogether negligent. For it is the case that as a result of representations made about that time, both the Home Office and, we understand, the Admiralty took steps to bring the advantages of meatal plugging to the notice of workmen, gunners, and others exposed to loud noises.

As to the material used for the purpose, plain cotton-wool is the handiest and most popular. Unfortunately, as anyone can ascertain for himself, it is also the least efficacious. Its value rises, however, if it is plentifully smeared with vaseline, or better still, if it takes the shape of a plug of some mouldable or plastic material. The Home Office and, it is said, the Admiralty also, advise plasticine with cotton-wool worked up in it as a binding substance—like the hair in wall-plaster. And a particularly elegant material of similar consistence is supplied by surgical instrument makers who specialise in hearing appliances. Our readers have also doubtless had their attention drawn to other plugs, all of which are probably of considerable value.

There is one little practical point in the use of plastic meatal plugs which deserves note. After the plug is packed into the meatus, the air contained in the canal, becoming warmed, expands and causes an unpleasant sense of fulness or pressure in the ears. This can be easily remedied by releasing the plug for a moment, so as to allow an escape of the excess of air.

The importance of Dr. Ritchie Rodger's advocacy of the meatal plug requires no special insistence at the present moment. But this we may say, that the knowledge of its usefulness should be brought to the notice not only of naval gunners and of artillerymen, but also of all those who may be exposed to the nerve-racking din of a modern battlefield.

For, in addition to shielding the delicate cochlea from the destructive action of loud noise, the meatal plug also protects the brain against the exhausting effects of an incessant series of excessive auditory stimuli, the wasting influence of which upon the reserve stores of nerve-energy may be suitably compared with the neurasthenia-producing effect of severe, persistent pain.

Physiologically speaking, of course, loud, unpleasant noise is equivalent to pain.

REPORTS FOR THE YEAR 1914 FROM THE EAR AND THROAT DEPARTMENT OF THE ROYAL INFIRMARY, EDINBURGH.

Under the care of A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.

PART I.

NOISE-DEAFNESS: A REVIEW OF RECENT EXPERIMENTAL WORK, AND A CLINICAL INVESTIGATION INTO THE EFFECT OF LOUD NOISE UPON THE LABYRINTH IN BOILER-MAKERS.

By T. RITCHIE RODGER, M.D., F.R.C.S.E.,
Clinical Assistant.

THE deafness induced in the workers in certain trades and callings by the prevalence of unusually loud noises has generally been designated "occupational deafness," but it has been very properly pointed out by Dan McKenzie that this term includes also such conditions of very diverse aetiology as Caisson-deafness and the deafness associated with lead-poisoning. I have, therefore, adhered to the more restricted term "noise-deafness."

Although the incidence of noise-deafness, as affecting blacksmiths, boiler-makers, railway and factory employés, engineers, and others has been long recognised both by the profession and by laymen, no systematic investigation of the subject seems to have been conducted until Dr. Thomas Barr in 1886 read before the Philosophical Society of Glasgow a paper entitled "An Inquiry into the Effects of Loud Sounds upon the Hearing of Boiler-makers and others who work amid noisy surroundings." Since that time, as far as I have been able to gather, no further contribution of any extent has been made in the English language. On the Continent, however, the subject has been widely canvassed in recent

years. Habermann, of Prague, had indeed in 1890 (1) published the clinical records of 30 cases without apparently arousing much interest in the subject, but when sixteen years later he contributed reports on a further 107 cases (2) with the pathological findings of the *post-mortem* examination of the inner ears of 5 cases, laboratory workers particularly saw that these results offered them an interesting field of study. In the following year, Wittmaack, of Jena (3), published his experimental work on guinea-pigs, and although his technique seems to have been faulty in some respects and some of his conclusions weakly supported by his arguments, to him must be accorded the honour of having been the first to elucidate the subject of noise-injuries by experimentation, and incidentally to point out that on some similar experimental basis must rest the ultimate proof or disproof of Helmholtz's theory of perception of sound. A year later, Yoshii, of Japan (4), working in Siebenmann's laboratory at Basle, set out to extend Wittmaack's experiments along certain lines and found occasion to revise some of the conclusions assumed by the latter. Von Eicken (5) and Hoessle (6) followed suit, and, besides adding a considerable amount of new material, confirmed on the whole Yoshii's views of the points in dispute.

Wittmaack's series of animals were divided into four groups :

(1) Six guinea-pigs were exposed to the continuous sound of an electric bell placed in the animals' wooden cage. After continued treatment the animals were killed at intervals varying from five to sixty days, when the petrous portion of the temporal bone was fixed by a method he describes in detail, and sections examined microscopically. No change was noticed in the physical condition of the animals during life and no pathological change of any kind was noted on microscopic examination.

(2) The next six animals were exposed to similar sounds conveyed this time by both bone-conduction and air-conduction, the cages being made of metal and the vibrations being conveyed to the metal floor. This time the animals showed rapid wasting, and whereas the intention had been to kill them at similar intervals to those of Group 1, only the earlier ones required such interference, as all were dead within sixteen days. The two last survivors were found sitting on the dead bodies of their companions, in a vain endeavour to escape the vibrations conveyed through the floor of the cage. On examination after fixing as before, no change was found in the middle ear, but in the inner ear was seen a commencing degeneration in the nerve cells of the cochlear ganglia and of the nerve fibres of the ramus cochlearis and a commencing decay of Corti's organ. No change was found in the vestibular nerve or its end-apparatus.

(3) Thinking that the absence of intermission of the vibrations might explain the severe constitutional signs, it was determined to approximate the next experiment to the conditions obtaining in actual occupations, and the noise was intermitted at night, the animals being exposed to the noise during the day-time only. It was now found that there was no loss of weight—indeed, most of them put on

weight, feeding well at night. Killed at intervals of 3 to 250 days afterwards they showed the same changes as described above (2).

(4) Experiments were next instituted with noises of short duration but intensive. Of these there were two sub-groups:

(a) Animals exposed to short intense noises oft-repeated. A shrill whistle was employed, a full blast being applied over a glass funnel at the animal's ear. As a rule the animal sank immediately unconscious, and remained so for some seconds, with complete relaxation of muscles and inhibition of sensation, but recovery was always speedy. This procedure was repeated daily or every second day, and the animals were killed from 3 to 30 days after the first exposure. On examination, no changes were found in the middle ear, not even rupture of the membrane. In the inner ear, no hemorrhage or tears of the delicate membranes or any such gross changes were seen, but definite changes similar to those already described were found in the cochlear ganglia and nerves and in Corti's organ, varying in degree according to the date at which the animal had been killed. The degenerative process reached its highest degree in the lower part of the lowest turn of the cochlea, and in this region, in the case of the animals longest exposed, not even a spur of Corti's organ remained.

(b) In the second sub-group, the animals were killed at intervals of 1 to 60 days after a single exposure to the blast of the whistle. The same results as above were noted, but very much slighter in degree, and passing off gradually according to the length of time the animals were allowed to live after exposure.

We might summarise in the following manner the minute changes found by Wittmaack in Groups 2, 3 and 4:

(1) In the ganglion cells of the spiral lamina, disappearance of Nissl's granules, vacuole-formation, the presence of bodies like "asthma-crystals," changes in the nucleus, which had taken on an irregular contour and become homogeneous in structure. In the more severe cases the vacuoles were very large and the protoplasm shrunken.

(2) In the nerve-fibres in the spiral lamina very marked changes were also seen. Individual fibres had lost their regularly uniform calibre, showing alternate swelling and narrowing. Actual segmentation was seen in the more severe cases, and in most cases proliferation of interstitial cells had occurred.

(3) In Corti's organ the changes ranged, according to the severity of the pathological process, from slight swelling of the hair-cells and their supporting cells to such an extensive atrophy of the whole end-organ that nothing of it remained beyond the merest fringe of flattened epithelium. Cases of moderate severity showed vacuole-formation in the hair-cells and rod-cells; the latter had lost their upright position, and the tunnel-space was consequently contracted. Deiter's and Hensen's cells had lost their characteristic structure, and in their place was found a heap of cubical and cylindrical cells becoming gradually more and more flattened.

(4) Other changes within the scala media were not well noted by Wittmaack, but Yoshii, who agreed essentially as regards the observations just detailed, found the membrana tectoria in lighter cases occupying a more or less erect position, while in severe cases it was fibrillated or even torn, with its remains resting on the atrophied Corti's organ. Wittmaack described tearing of Reisner's membrane with glueing of the external portion to the stria vascularis. Yoshii declares that such an appearance could only be due to an artefact, and describes the pathological change seen in this structure as consisting of thickening and infiltration of its outer part. He found also similar cell infiltration in the stria vascularis and in the basilar membrane.

But the chief point on which Yoshii found it necessary to join issue with the earlier observer was the condition of the cochlea after exposure to sounds conveyed by air-conduction without the aid of bone-conduction. Wittmaack had discovered no change in such cases, but Yoshii with more careful methods was able to demonstrate all the above-mentioned changes after experiments on similar lines. This question, of course, as far as the relationship of the experimentation to occupational deafness is concerned, is the crux of the subject from the point of view of utility at least. If Wittmaack is right in holding that the injury does not reach the ear by the *via physiologica* (air-conduction), but only through the bone, the customary advice to people exposed to such dangers, to protect the ears by some form of obstruction in the meatus, is of no avail. Besides being able to demonstrate the presence of the lesions after exposure of the animals to purely air-conducted sounds, Yoshii proved his point in other ways. One of his animals had developed a middle-ear condition, and after being treated like the others it was found that the cochlea on that side had escaped the pathological process, which on the other side presented the usual marked appearances. Further, in the case of the last animal of his series, on which he experimented with detonations from a revolver, he describes the following result: "When the shot was fired (at a distance of 20 c.m.), the animal was greatly frightened, lost his liveliness, and became very slow in his movements. A few moments later it scarcely reacted at all to hand-clapping, but became more sprightly in five minutes. It showed, however, neither nystagmus nor disturbance of equilibrium. At the end of five minutes it was killed. On examination the right ear showed a large perforation in the lower part of the drumhead. The mucous membrane of the tympanic cavity was hyperæmic, especially in the

region of the promontory and at the tympanic ring. In the latter place there was also a small amount of free blood. Examination of the inner ear, however, revealed no change—Corti's organ was normal in every part. Tectorial membrane and Reisner's membrane showed no change: no bleeding or exudate was seen anywhere. Sacculæ, utricle, ampullæ, and canals were normal. On the left side, however, quite a different picture presented itself. Drumhead and middle ear were quite normal—no hæmorrhage or hyperæmia were seen. In the inner ear, however, a distinct degree of change was noticeable quite in consonance with the alterations already described. Corti's organ showed the boundaries of the hair cells and Deiter's cells somewhat obliterated, Hensen's cells flattened, and the pillar-cells pressed in. In this case it was apparent that the membrane on the right side having given way before the violence of the sound-waves, such a dissipation of the air pressure occurred as prevented the end-organs on that side from receiving such a shock as was conveyed to the cochlea of the other side by the intact conducting media. Yoshii, in my opinion, rightly claims this as supporting his contention that the injury is conveyed to the inner ear by the ordinary conducting media, but seems to be on less sure ground when he explains that with a ruptured membrana tympani the flaccid membrane of the round window receives the vibrations and transmits them through the cochlea canal in the reverse direction to the normal. He holds that this flaccidity of the membrane of the round window depreciates the energy of the vibration and prevents the over-excitation which would produce the pathological condition in the inner ear. This reverse current may, perhaps, be accepted as a fairly satisfactory explanation of the remarkable amount of hearing sometimes present with large perforations of the drumhead, and at the same time loss of one or more ossicles. It seems much more simple to explain the case in question, however, by supposing that the vibrations were still transmitted by the ordinary route through the oval window, but that the rupture of the membrana tympani impaired its function, and caused too much loss of energy for over-excitation to take place in such degree as is required for the production of pathological changes after a single exposure. Von Eicken followed with a series of animals in which the incus on one side had been removed, and in every case he found that on that side the inner ear had escaped injury, while the other showed the typical changes already described. Hoessli also more recently removed the incus with the same result, and also experimented with an animal, the subject of middle-ear disease on one

side, finding, as did Yoshii, that this side escaped injury to the cochlea. He further made experiments with animals insulated, as far as bone-conduction was concerned, by a matting of felt placed on the floor of the cage, as suggested by Wittmaack, and found that this had no effect in preventing the onset of the disease process. Habermann also includes in his five *post-mortem* reports on men who had been the subjects of occupational deafness one who had unilateral middle-ear disease. He found the inner ear intact on the side of the middle-ear lesion. It may thus be taken as conclusively established that it is by the way of the chain of ossicles and the oval window that the excessive impulses reach the inner ear in this form of deafness.

Another assumption by Wittmaack which, like the one first dealt with, probably did a good deal to arouse the interest taken in his work and also to stimulate the later experimenters, was that, contrary to what had hitherto been supposed, the degenerative change consisted primarily in an atrophy of the ganglia of the spiral lamina with secondary degeneration of the end-organ, instead of a primary atrophy of Corti's organ with an ascending degenerative change involving the nerve-fibres and ganglion cells. He supports his contention by very indifferent arguments, and even makes the fatal admission that in one of his animals killed immediately after exposure he detected changes in Corti's organ without being able to demonstrate any change in the corresponding nerve-fibres and ganglia. Yoshii's results led him to the opposite conclusion, and Habermann," whose *post-mortem* observations on the human subject had been published before Wittmaack's work appeared, had no doubt that the disease was primarily one of Corti's organ with ascending degeneration in the nerve, because, as he says:

"While Corti's organ was markedly involved, particularly as regards the sense cells, and while the nerve-fibres also showed marked degeneration, the ganglion cells only in some instances were affected, and in such cases only the distal cells were involved."

Yoshii also found himself at variance with Wittmaack as regards his assertion of the complete immunity of the vestibular apparatus. While his experiments with whistles and sirens, like those of Wittmaack with the electric bell, produced no change here, it was not so when the animals were exposed to repeated revolver shots. This observation was supported by clinical signs, as in one of the animals marked disturbance of equilibrium was noted.

"After the first shot in front of the right ear as usual nothing striking happened, but shortly after the second shot was fired close to the left ear, the animal drew

his head to the left and at the same time executed rhythmic pendulum movements to the same side in a horizontal direction. Both eyes were markedly deviated to the left and at the same time an undoubted nystagmus developed. The animal swung itself for a long time to the same side and several times fell down, apparently in consequence of an inco-ordination of the hind legs. The condition passed off in about an hour.

The minute examination revealed in addition to such cochlear changes as have been already described,

“ blood corpuscles sparsely strewn in saccule and utricle; in the vestibular nerve varicose formation of fibres, but not so marked as in the cochlear nerve; the epithelium of the macula sacculi and macula utriculi and of the cristæ ampullares swollen; in the canals themselves nothing abnormal.”

In concluding this *resumé* of recent experimental work on the Continent, I would refer briefly to Yoshii's further experiments with sounds of varying pitch for the purpose of testing, as suggested by Wittmaack, the accuracy of the Helmholtz theory of the perception of sound. With a whistle producing a note = C^5 (about 4096 double vibrations per second) he found the maximum amount of atrophy consistently located in the upper half of the basal coil of the cochlea; one producing a note = A^2 (about 838 double vibrations) gave changes in the middle and upper part of the second lowest coil; while one producing a note = G (about 192 double vibrations) gave rise to changes half a coil higher. It was found that, no matter how pure the note was, the pathological change had quite a measurable distribution, being most marked in the centre of the area involved and tapering off above and below. He accordingly assumes that Helmholtz's theory is essentially correct, although the parts of the sound-perceiving end-organ are not so definitely isolated in their action as the parts of the keyboard of a musical instrument.

Such a wealth of laboratory results having thus recently been placed at our disposal, there is room for further clinical investigation, to extend the observations of Barr and Habermann already referred to, and I now propose to submit some notes on the examination of forty-eight cases of occupation deafness. Of these, four were seen in Dr. Logan Turner's clinic, two being blacksmiths, one an engineer, and one a brass-finisher. The remaining forty-four were boiler-makers and rivetters, who were seen, not as patients, but for the purpose of the investigation. Care was taken to secure a proper proportion of the younger men, so that the condition might be studied in relation to the length of time the trade had been engaged in. The accompanying scheme of examination

was followed, but the caloric tests were naturally somewhat unpopular, and only fifteen submitted to them.

SCHEME.		
Name.		Occupation.
Age.		Date.
Address.		
History : How long at trade ?		
Is deafness present ?		Duration ?
Noises in ears ?		
Paracusis Willisii ?		
Any previous ear trouble ?		
Any family history of deafness ?		
Objective examination : R. M. T.		L. M. T.
R. nasal fossa.		L. nasal fossa.
Lip-reading present ?		
	R.	L.
Functional examination :	(1) Conversation voice.	
	(2) Whispered voice.	
	(3) Weber.	
	(4) Schwabach.	
	(5) Rinne.	
	(6) Tuning fork 32 (duration).	
	(7)	419 „
	(8)	512 „
	(9)	2048 „
	(10) Upper tone limit (monochord).	
	(11) Cold caloric test.	

I introduced forks A¹ (419 double vibrations) and C² (512 double vibrations) into the scheme because, after repeated testing in the different parts of the boiler-shops and rivetting yards while the men were at work, and after having my observations confirmed by a person with a good musical ear and training, I found that the predominant sounds ranged between G¹ and C². Barr and Habermann both refer to the “shrill” noises to which these workmen are exposed, and others have followed their example, but probably the only subjects of occupation deafness who are exposed to shrill sounds are engine-drivers and other railway employes.

I shall deal later with the question of the marked deterioration in the hearing of sounds of high pitch as found in cases of long standing, but the explanation is, I think, not to be found in the predominance of noises of such high pitch in the workshop.

The method employed to determine the duration of hearing was to note the number of seconds during which the examinée heard the sound and then to transfer the fork to my own ear, recording his time as the numerator and mine as denominator. It

is true that there is a slight fallacy in such a course, as the examinée's ear receiving the earlier and louder part of the sound undergoes a certain amount of exhaustion to the particular note in question, but after going into the matter carefully with persons of normal hearing I arrived at the conclusion that the difference is so small as to have no appreciable effect on my statistics. To determine the upper tone limit I used the Schulze-Struycken monochord as being more accurate than the whistle. We are still in need of some extended observations to determine what should be looked upon as the average limit of hearing for high tones, but after examining twenty persons with normal hearing I am of the opinion that it does not exceed 17,000 to 18,000 double vibrations up to twenty-five years of age (although, of course, individual cases reach 20,000 or higher), while between forty and fifty years of age the average is probably as low as 14,000.

Of the ninety-six ears thus examined, otorrhœa was found to be present in four, one bilateral case, and two unilateral. These six cases gave lengthened Schwabach and negative Rinne. On another ear the radical mastoid operation had been performed, leaving lengthened Schwabach and negative Rinne, but no hearing for any tuning fork by air-conduction. One other ear with a dry perforation gave similar results to the Schwabach and Rinne tests, whereas other two with dry perforations, as well as three others with a history of otorrhœa of very short duration, gave shortened Schwabach and positive Rinne. I shall refer to these later, but have eliminated them all from the statistics following, which thus have reference only to inner-ear deafness, uncomplicated by any middle-ear condition, past or present.

I have divided the cases into three categories according to the length of time they had been employed.

I.—Of twenty men who had been less than ten years at work, eight declared at the outset of their examination that they were not deaf at all. In every case, however, depreciation of hearing was demonstrated, sometimes only for the medium tuning forks, but generally for all the forks, with more marked deterioration for the medium. In all cases, both in this group and in the others, the deafness was combined with shortened Schwabach and positive Rinne. In the whole of this group, raising the figures to percentages for the sake of easier comparison, I found that with

32 D.V. 4 per cent. equalled my own duration of hearing.

16 per cent. had $\frac{2}{3}$.

80 per cent. had less than $\frac{2}{3}$.

419 D.V.	None equalled
	44 per cent. had $\frac{2}{3}$.
	56 per cent. had less than $\frac{2}{3}$.
512 D.V.	None equalled.
	41 per cent. had $\frac{2}{3}$.
	59 per cent. had less than $\frac{2}{3}$.
2048 D.V.	10 per cent. equalled.
	53 per cent. had $\frac{2}{3}$.
	37 per cent. had less than $\frac{2}{3}$.

As regards the upper tone limit, 77 per cent. could hear 16,000 double vibrations, and only 3 per cent. came below 15,000. One ear could appreciate 20,000, although the hearing for the medium forks was reduced to $\frac{2}{3}$, while three could hear 19,000 with hearing for medium forks reduced to $\frac{2}{3}$.

II.—Of those from ten to thirty years at work (thirteen men):

For 32 D.V.	None equalled examiner's duration.
	62 per cent. had $\frac{2}{3}$.
	38 per cent. had less than $\frac{2}{3}$.
„ 419 D.V.	None equalled.
	38 per cent. had $\frac{2}{3}$.
	62 per cent. had less than $\frac{2}{3}$.
„ 512 D.V.	None equalled.
	13 per cent. had $\frac{2}{3}$.
	87 per cent. had less than $\frac{2}{3}$.
„ 2048 D.V.	None equalled.
	14 per cent. had $\frac{2}{3}$.
	86 per cent. had less than $\frac{2}{3}$.

Sixteen per cent. of these attained an upper tone limit of 16,000, while another 20 per cent. reached 14,000; 12 per cent. did not hear 2000, the remaining 52 per cent. hearing from 9000 to 11,000.

III.—Fifteen men had been over thirty years employed, but it should be stated that only two of these had reached the age of sixty, so that the incidence of any appreciable degree of senile deafness may be discounted.

For 32 D.V.	None equalled.
	18 per cent. had $\frac{2}{3}$.
	82 per cent. had less than $\frac{2}{3}$.
„ 419 D.V.	None equalled.
	23 per cent. had $\frac{2}{3}$.
	77 per cent. had less than $\frac{2}{3}$.
„ 512 D.V.	None equalled.
	25 per cent. had $\frac{2}{3}$.
	75 per cent. had less than $\frac{2}{3}$.
„ 2048 D.V.	None equalled.
	12 per cent. had $\frac{2}{3}$.
	88 per cent. had less than $\frac{2}{3}$.

As regard the upper tone limit 9 per cent. of these heard 13,000, 30 per cent. could not hear 2000, while the remainder ranged between 9000 and 11,000.

From a consideration of these figures it is apparent that in the earlier stages, at least, the condition of noise-deafness does not affect principally the perception of high tones as has been hitherto generally accepted. In Group I we find the upper tone limit scarcely affected, although there is marked loss of hearing for tuning forks corresponding to the predominant noises. Doubtless the explanation of the marked loss of hearing for very low tones in these cases lies in the prevalence of the low rumbling noises of machinery. It is only when we come to Groups II and III that we find a clinical picture such as has hitherto been accepted as typical of the condition, with marked loss of hearing for high notes. Probably this is sufficiently explained by the fact that cases seen as patients are always more or less in an advanced stage, whereas out of the whole of Group I of my cases not one had sought advice for the condition, which had not proved a serious inconvenience.

It is apparent that the pathological condition involved is an exhaustion atrophy from over-excitation, affecting primarily the parts of the cochlear duct corresponding to the prevailing sounds, and doubtless a *post-mortem* examination on an early case would reveal such well-defined areas of change as were found after experiments on animals by the observers already referred to. Conversely it is more than probable that had these experiments been carried into years instead of days the pathological picture would have shown, as in Habermann's examination of the ear of an old boiler-maker, a preponderance of the atrophy in the lowest part of the cochlea. Habermann, while not avoiding the pitfall of assuming, as others have done, that the prevailing sounds are of high pitch, admits that this cannot explain fully the excessive involvement of that area, and suggests that there is probably a poorer blood-supply and consequently defective nourishment there, citing, in support of this hypothesis, the fact that in arterio-sclerosis and in the other forms of nerve-deafness this same area is first and particularly involved. On the other hand, it may be that the predilection of the disease for this area, alike in noise-deafness and in those other conditions, is to be simply explained by the well-established law of pathology that the most delicate and highly-developed part of any organ is always the most vulnerable.

In railwaymen, however, exposed to the shrill notes of the

engine whistle, Putelli, of Venice (7), has found direct injury to that part of the cochlea concerned in the perception of high notes. His results are in all respects in accord with the foregoing deductions. In every case he found Schwabach shortened and Rinne positive. Hearing for low and medium tones was normal, while there was marked depreciation for tuning forks C_4 and C_5 .

With regard to *subjective noises*, 56 per cent. gave a history of this symptom. Barr found this in 34 per cent. of his cases, and I agree with him that it is in the early days of their occupation that men suffer from it. Most of the apprentices said they had noises after leaving their work at night, and many of the older men, who at first replied in the negative to the question, admitted, when more closely questioned, that in their earlier years they had suffered from such noises. These were most frequently of the nature of a ringing of bells; sometimes of buzzing, humming, hammering, whistling, or blowing.

Vestibular Apparatus: Giddiness.—I obtained a history of this in 10 per cent. of cases. Barr found it in 14 per cent., and Habermann in 16 per cent. Neither of these observers attributed much importance to the phenomenon as an integral part of the symptom-complex, but in the light of the most recent work on the vestibular function there is some reason for our looking upon this symptom as an indication of slight concomitant disturbance of the vestibular apparatus. Yoshii, as already stated, found that one of his animals gave marked signs of disturbance of equilibrium during his detonation experiments, and examination of one ear after death showed, in addition to the usual cochlear changes, similar though slight changes in the vestibular apparatus. Such vestibular changes were not found in any of the other experiments, no matter how loud the sound, nor how high or low its pitch, detonation being evidently the determining element. Now, when we consider how much the sounds of hammering on metal partake of the character of a repeated detonation, we cannot express surprise if we find among many of these workmen signs of an affection of the vestibule, and, as has been already mentioned, Habermann, although noting no clinical manifestations of such a condition, actually found, *post mortem* in the victims of noise-deafness, increased pigmentation in the ampullæ and hyperplasia of the conical ridges. On applying the cold caloric test to both ears of fifteen cases, I obtained an average induction period of 45 seconds for the nystagmus (33 seconds in Group I, 44 seconds in Group II, and 50 seconds in Group III). As the average in normal ears does not exceed 25 or

30 seconds, it will be seen that even in the early cases there is slightly diminished sensibility of the vestibular apparatus, while in the established cases this is quite marked.

Dan McKenzie (8) also, in the paper in which he first brought to the notice of otologists the use of the induction period, states that in the series of cases examined for the purpose of his article he included a number of cases of noise-deafness, and found the reaction delayed. It therefore seems justifiable to assume, from the history of giddiness on the one hand, and the obtaining of a delayed caloric reaction on the other, that, contrary to the hitherto accepted belief, the vestibular apparatus does not entirely escape, in the form of deafness under consideration.

To return to the eleven ears excluded on account of middle-ear disease, past or present, these do not at first sight seem to give unqualified support to the contention that the presence of such disease obviates the onset of the inner-ear condition, inasmuch as five of them gave shortened Schwabach and positive Rinne. It will be noted, however, that of these five three presented a history of otorrhœa of very short duration (two were accounted for by a case of bilateral otorrhœa lasting for a very short time after acute pneumonia, and the third had discharge on two occasions lasting only two weeks), while the remaining two had dry perforations. Now, middle-ear disease could obviously only act as a protection to the inner ear against the effect of injurious noises in proportion to the amount of interference it caused to the sound-conducting apparatus, and it is well known that otorrhœa of very short duration may leave the hearing practically unaffected. Hence, we might assume that the middle-ear condition in these cases had been too slight or too short-lived to produce marked permanent interference with sound conduction.

To deal lastly with the question of prophylaxis, Wittmaack's advocacy of a rubber mat does not merit consideration, founded, as it was, on the assumption that the injury reached the inner ear by bone-conduction, and directly disproved, as it has been, by Hoessli's experiments with it. All hope of any prevention or mitigation of the condition must be based on some means of occluding the external auditory meatus, and so obstructing in some measure the injurious waves of sound. Different materials have been recommended—plugs of rubber, celluloid, or cotton-wool, the last named made up with jeweller's wax or simply smeared with vaseline, but the great difficulty is to get the workmen to take the trouble to use them regularly. It is customary for them to insert

"cotton-waste" in their ears when engaged at "caulking" or "holding on," at which work they are standing or sitting inside a boiler, with several men hammering on the outside, but otherwise they, as a rule, take no precautions, the opinion being apparently a fixed one among them that nothing will prevent the deafness. In recent years it has been made one of the duties of gunners in the British Navy to see that their crews are supplied with cotton-wool for their ears during gun practice, and I had recently an opportunity of noting the beneficial effect in the case of a gunner of ten years' standing. In this case the left ear had normal hearing while the right ear (which is nearer to the gun) showed a depreciation of only $\frac{1}{4}$ for tuning forks up to 2048 double vibrations, while the upper tone limit was 16,000 in each ear.

If civil employers could be induced to make similar provision for their workmen and to make it incumbent on their foremen to see that the preventive measures were regularly made use of, there is every reason to expect that extreme cases of noise-deafness would rarely be met with.

The following conclusions seem to be justified :

(1) That loss of hearing for high notes is not, as hitherto taught, the outstanding feature of noise-deafness.

(2) That the predominant noises to which the patient has been exposed determine the site of the initial lesion in the inner ear, and that for a considerable time the depreciation of hearing is mainly for sounds of a pitch corresponding to these noises.

(3) That later, the unusual vulnerability of the lowest part of the cochlear canal gives rise to marked loss of hearing for high tones.

(4) That the vestibular apparatus in such occupations as boiler-making, where loud hammering is being carried on, is also affected, although in less degree than the cochlear apparatus.

(5) That the condition of noise-deafness could be to a very large extent obviated by the use of suitable ear-plugs.

I wish, in concluding, to express my indebtedness to Drs. A. Logan Turner and J. S. Fraser for helpful suggestions and facilities given me, also to the managers of Leith Hospital for accommodation for the examination of patients, and the firm of Messrs. Hawthorn and Morton, shipbuilders, Leith, for access to their works and employés.

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SOME CONSIDERATIONS WHICH DETERMINE THE EXTENT OF AN OPERATION IN SEPTIC INVASION OF THE LATERAL SINUS.¹

BY HUGH E. JONES, M.R.C.S.,

Senior Surgeon, Liverpool Eye and Ear Infirmary, etc., etc.

I do not commence an operation with the fixed idea that the venous channel must be obliterated, its lumen exposed, and, as far as possible, its walls excised from the torcular Herophili to the junction of the jugular vein with the innominate; nor, on the other hand, do I say to myself, "all that is necessary is to plug the sinus for an inch or two after removing the clot." The conditions found are so varied that the maximum operation may in one case be as futile as the minimum, in another the minor as successful as would have been the major, while in a third the maximum operation would appear to give the best, if not the only, chance of recovery. For this reason also it seems to me that collected statistics are particularly baffling and of little value as a general guide to the extent of the operation required in an individual case. My own experience, contrary, I fear, to the expectation of the gentlemen who have honoured me by asking me to read a paper on this subject, is comparatively small,² but, if small, it has been fairly varied, therefore I do not propose to analyse figures, but to give my thoughts and conclusions as to the best methods of dealing with such conditions as it has been my fortune to recognise. I have also, in answer to set questions, obtained from twenty-five British otologists, practising outside London, expressions of opinion based on their own experience on varied points of interest. These answers have been tabulated and analysed. I propose to give you the result of this analysis and to print with my paper, if the editors permit, the actual replies or the substance of the replies received. Many of these replies are of great interest, and I take this opportunity of

¹ Read at the Clinical Congress of Surgeons, London, July, 1914.

² About 30 cases.

publicly thanking those gentlemen who have kindly sent them for the great interest they have shown and the trouble they have taken.

FACTS WHICH INFLUENCE THE EXTENT OF THE OPERATION BEFORE THE OPERATION IS BEGUN.

Let us consider for a moment the anatomical and pathological possibilities of extension of infection or of the actual clot from a given focus.

I have recorded a case of metastatic abscess near the shoulder in a simple streptococcal acute otitis media without bone disease or sinus thrombosis.¹ Such cases, and cases of temporal bone pyæmia without thrombosis of the sinus, do not strictly come within the scope of this discussion, but they have to be taken into account because they may cause systemic symptoms similar to those of true sinus thrombosis. The rare cases of primary septic thrombosis of the petrosal sinus, or a persistent petro-squamosal sinus, may also give early pyæmic symptoms without at once causing thrombosis of the lateral sinus or bulb. It follows that systemic symptoms, with or without labyrinthine disturbance, and without any local signs of bone infection, should receive the utmost consideration with regard to the necessity for local surgical measures.

Coming to the common mode of infection—caries of the wall of the sulcus lateralis or of the jugular bulb and perisinus abscess—we find that we have in the majority of cases a more regular progression of events; this progress being interrupted at various stations for a shorter or longer period according to the anatomical features, the virulence of the infection, and the resisting power of the patient. A perisinus abscess may exist for a considerable period before the wall of the sinus succumbs (and may during that time cause a rigor), may even discharge itself through the fistula formed in the posterior wall of the mastoid without having invaded the sinus. When the sinus wall is penetrated and a clot forms, the process may be arrested at the jugular foramen in one direction and at the entrance of the superior petrosal sinus in the other, a firm clot with a small central abscess being the result. Such a case as this has been known to undergo spontaneous cure by the discharge of the abscess through the sinus wall and the fistula in the mastoid wall.

¹ *Brit. Med. Journ.*, 1906, vol. ii.

Tracing the progress backwards—when the clot reaches the horizontal sinus there is nothing to prevent its extending to the torcular Herophili or small fragments being carried by the backwash into the torcular Herophili, and once there the progress of the infection to the other great sinuses is easy. This question of extension to the opposite sinuses has not received the attention it deserves in literature. I reported a case of infection of the opposite lateral sinus as long ago as 1893,¹ and at later dates two other cases, one of which had a large abscess in the occipital and temporo-sphenoidal lobes of the opposite side. My first two cases died; the third, in which the local signs were limited to extreme tenderness along the course of the internal jugular vein, recovered after a long illness, without operation on the opposite sinus or vein. Mr. A. L. Whitehead recorded a case in 1907² which recovered, and Mr. C. E. West, in discussing the case, referred to one in which he tied both internal jugular veins, the patient dying from purulent meningitis. Mr. S. Lodge, in 1900,³ published an obscure case, which was shown *post-mortem* to have thrombosis of both lateral sinuses. Voss,⁴ in a recent paper, lays particular stress on backward extension and the means of preventing it. I think this extension is a possibility which is occasionally overlooked and it is not unlikely that operations in the wrong direction are sometimes performed with the object of arresting systemic infection. *When and while the sigmoid sinus is firmly clotted* extension downwards appears to me less likely to happen than in a backward direction; at one end there is the narrow jugular foramen occasionally crossed by fibrous septa⁵ with the curved recess beyond it, into which the end of the clot would first be carried. At the other end a wide unobstructed sinus. I conclude, therefore, that extension downwards, if it takes place at all, does so before the sigmoid clot is fully formed, or after disintegration has set in, or when a half-formed or breaking-up clot is disturbed by operation or sudden movements of the head and neck. Such conditions, *i. e.*, the presence in the sinus or vein of septic fluid or semi-fluid contents urgently demand immediate ligation and excision or free opening of the vein. When, either primarily or secondarily, a firm clot has formed in the bulb or in any part of the vein above the common

¹ *Brit. Med. Journ.*, 1893, vol. ii, p. 563.

² *Proc. Roy. Soc. of Med.*, vol. ii, Otol-og. Sect., p. 1.

³ *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, 1900.

⁴ *Deutsche Zeitschrift für Cher.*, 1913, p. 375.

⁵ H. E. Jones, *Brit. Med. Journ.*, 1906, vol. ii.

facial, a temporary arrest of its progress may occur either at the exit from the bulb, with complete collapse of the walls of the upper segment of the vein, or just above the level of the common facial vein, but once it has come under the influence of the facial vein its extension or propulsion downwards can only be arrested by a ligature or absolute rest in the dorsal position.

There are thus five stations at which the natural progress of infection may be temporarily arrested, viz. at the sinus wall, at the superior petrosal sinus, at the entrance into the bulb, the exit from the bulb, and finally at the junction of the facial vein. It is for the surgeon to determine what stage has been reached at the time of the operation. Whether it is possible to limit the extent of the operation accordingly will depend on the virulence of the process, the clot-forming and germ-forming power of the individual's blood.

There is one direction of extension which we have not yet considered, viz. along the petrosal sinuses to the cavernous sinus. This is, in my opinion, a comparatively rare occurrence. I, personally, have not seen it in the course of a case which began as lateral sinus thrombosis. It has to be considered in relation to ligation of an internal jugular vein which contains a mural or a disintegrating thrombus, in relation to the question of irrigation of the vein or sinus, and the question of the necessity for the complete exposure of the jugular bulb. Two of my correspondents altered their practice with regard to ligation of the vein because they believed that ligation had caused immediate invasion of the cavernous sinus.

My own opinion is that a septic infection of the cavernous sinus will not readily arise without interference, because of the narrowness of the superior petrosal sinus and its proximal situation in relation to the focus of infection, and because the inferior petrosal sinus is largely protected by its valvular entrance into the lower end of the bulb¹ or upper end of the vein. The valvular entrance is, however, no protection against a return flow of septic blood from the vein, nor from irrigation from vein to sinus. The vein, if tied, should, therefore, be also excised or opened at once (after occlusion of the proximal end of the sinus, when the contents are more or less fluid), and if irrigated, the process should be carried out from the sinus to vein.

The much discussed anatomical variation whereby one lateral sinus is made to do nearly all the work of two claims some con-

sideration.¹ None of my correspondents have referred to the matter and I have no personal experience of this variation. In the case referred to above in which both sinuses were completely occluded, there was great engorgement of the veins of the scalp, and a congeries of veins had formed around the mastoid vein on the side originally diseased. As this patient died from temporo-sphenoidal abscess of the opposite side and toxæmia, I have no reason to suppose that the circulatory difficulty could not have been overcome. Whitehead's case quoted above also proves that the circulation may be re-established. The occurrence of a rudimentary sinus on one side is admittedly rare; Linsler puts it as 3 per cent., and there can be no doubt that by the time that the necessity for ligation of the internal jugular vein arises, especially in sinus thrombosis, compensatory collateral circulation has been, to some extent, established. When the *need for ligation is a real one* the risk of ligation must be taken, but if possible the facial and external-jugular veins should always be spared.

COMPLETION OF THE DIAGNOSIS DURING THE COURSE OF THE OPERATION.

The first necessity in treatment is a *complete diagnosis before or during the early stages of the operation, so that all that requires to be done may be done at the time without recourse to a second operation.* This, of course, is not always possible, but it is the thing to aim at. As has often been said, the existence of a thrombus does not in itself cause systemic symptoms, in fact, it may prevent them. On the other hand, general pyæmic symptoms in themselves do not prove the existence of a thrombus, nor do swelling and pain in the neck. It is necessary, therefore, in nearly all cases to expose the sinus as the first or (counting the mastoid operation as the first stage) the second stage of the operation. The only admissible exception to this rule appears to me to be when the disease has existed for several days, lung metastases are present, and rigors are frequent. In such a case the clot is probably in a state of disintegration, and a rapid exposure, ligation, and opening of the vein may save valuable time. Having thoroughly cleared out the mastoid and opened the groove of the sigmoid sinus and finding there perisinus abscess with granulations covering the sinus, or any departure from the normal appearance of the sinus, bone should be removed in both directions without disturbing or even touching

¹ For full discussion of this question and collected cases *vide* "Circulatory Disturbances following Ligation of Internal Jugular Vein." Wells P. Eagleton, M.D. *Arch. of Otology*, vol. xxxv, No. 2, 1906.

the sinus more than is absolutely necessary until at least half an inch of healthy wall is exposed, if possible, at both ends of the diseased areas. Several of my correspondents say that there are no reliable indications of the condition of the intima or of the character of the contents of the sinus, prior to an exploratory incision or aspiration. With this I cannot agree. My experience is that healthy granulations and pus, in the absence of a history of repeated rigors, vomiting, and oscillating temperature, indicate a sound intima and fluid blood. The absence of granulations over any part of a sinus which has not the healthy bluish-white semi-translucent normal appearance indicates infection of the intima and either solid or mural thrombus. A thickened, discoloured wall with severe systemic symptoms at an early stage means mural clot; at a late stage, after a comparatively quiescent period, disintegrating clot; mild systemic symptoms with partial collapse of the sinus and a sloughy wall at one point—the localised breaking down of a solid thrombus. If the focus of disintegration is in the tympanum or anterior part of the antrum, with normal appearance and pulsation, but increased distension of the sigmoid sinus, pain, tenderness and stiffness of the neck, and presence of systemic symptoms, the diagnosis is primary clotting of the bulb. These, and other indications given by some of my correspondents, seem to me to obviate in the great majority of cases the necessity for palpation or exploratory aspiration of the sinus. Incision should, in my opinion, be made not so much as an exploratory procedure, but as a continuation of the operation and with the necessity for obliteration of the sinus in one's mind. This being so, I expose the sinus until nearly an inch of healthy wall is uncovered on the torcular side and compress it there with a plug of gauze between dura and bone. If after following the sinus down towards the jugular foramen no healthy wall is reached; or if there is any doubt about the condition of the bulb and vein, and the systemic symptoms have been severe, I expose the internal jugular vein at the junction with the common facial. Hitherto, having exposed the vein, I have invariably dealt finally with it. *In future I shall expose the vein as one exposes the sinus for inspection and not necessarily for obliteration.* This was suggested to me by Voss's¹ paper and my correspondent, Mr. Geo. Wilkinson, of Sheffield, who lays great stress on the valuable information as to the condition of the bulb and sinus obtained by exposing the vein. Voss, when he does not find it

¹ *Loc. cit.*

necessary to tie the vein at once, introduces two provisional ligatures formed of strips of gauze around the vein, leaving the wound open so that the ligatures may at any time be tied without an anæsthetic and in the course of an ordinary dressing. This provisional ligature does not seem to me very important, *but the principle of exposing the vein for inspection and the information which may be got thereby, appears to be a distinct advance.*

Having made the diagnosis as complete as possible by consideration of systemic symptoms, the probable source of infection, inspection of the sinus and, if necessary, of the internal jugular vein, we are in a position to decide on the extent of operation required and to complete it at once. (I have said nothing about blood-counts, lumbar puncture, and bacteriological investigations, because they do not seem to me to have any important influence on the extent of the operation—at any rate, of the first operation; after this, they may afford valuable information leading to further operation or to the employment of suitable vaccines.)

CONCLUSION.

In every case of temporal bone disease with symptoms suggesting the presence of a perisinus abscess or the onset of pyæmia, expose the sigmoid sinus with the least possible disturbance to its walls until healthy wall is seen and the blood in the part is judged to be fluid and the lumen controllable. This may involve removing bone up to, or even over, the torcular Herophili, and down to within reach of the jugular foramen. If no disease is apparent except the extradural abscess and so-called “healthy” granulations springing from the sinus wall, and only one rigor has been observed—wait. If the pyæmia is established, but not severe, and there is a limited occluding clot in the sigmoid—compress above and below clot, remove clot, excise outer wall between the compresses, and pack with gauze. If the sinus is obviously diseased, but contents partly fluid, and systemic symptoms marked—expose internal jugular vein in neck. Even if sinus is *not* obviously diseased, and blood fluid, with severe pyæmia or symptoms of bulb-thrombosis, expose internal jugular vein, occlude both sinus and vein, drain and plug the intervening part. If sinus is clotted and the lower limit of diseased wall or clot cannot be reached, expose vein in the neck; this is merely the application of the principle of exposing healthy wall beyond each end of the clot, without undertaking the much longer and generally unnecessary

operation of exposing the bulb. Having laid bare the internal jugular vein at the entry of the common facial vein, we have several courses to consider. If the vein is of normal size, looks healthy, and blood is flowing freely through it, compress temporarily and remove the clot from the sinuss down to the jugular foramen. If there is a free flow of blood into the sinus, plug the sinus after draining, and either close the neck wound or put in Voss's provisional ligatures, according to the severity and duration of the systemic symptoms. If the vein is collapsed above the facial, but healthy and full of fluid blood below, tie in two places and divide above the facial, bring the upper end into the wound, and endeavour to clear out the clot from the bulb by gentle irrigation. The same procedure can be adopted if the upper vein is clotted, but the clot does not reach to the facial vein, and the lower vein is healthy. It is easier under these circumstances to clear the bulb than when the vein is collapsed.

When the clot extends beyond the facial junction it is better, in my opinion, to tie and divide the internal jugular as low down as possible in the neck. In one case where I had tied the vein below but near the facial everything was going on well when, two or three days after, the patient got out of bed, in the temporary absence of the nurse, with a rapidly fatal result. The presumption is that a healthy clot from the lower vein was dislodged and was carried into the heart.

Having dissected up the vein and tied off the tributaries, I excise the greater part and bring the upper end into the wound. There is always a temptation to leave the vein unopened the first day, for fear of severe hæmorrhage, but the risk of extension of sepsis from the upper vein is too great, and drainage from sinus to vein should be established at once. As I have already pointed out, the danger of irrigation downwards is slight, owing to the valvular opening of the inferior petrosal sinuss. The wound in the neck may be closed, except the upper inch, without packing, unless the walls of the vein are diseased—though the danger of suppuration along the trachea is a real one. In one case upon which I operated, but in which the after-treatment was not in my own hands, suppuration took place with perforation of the trachea and a fatal issue. I have no experience of resection of the clavicle nor of any attempt to deal with the subclavian or innominate veins. I have never tied both internal jugulars, nor have I explored both lateral sinusses in the same case. Both of these operations, however, appear to me to be within the bounds of practical surgery. Asso-

ciated cerebral and cerebellar abscess, meningitis and metastatic abscesses must, of course, be dealt with as occasion demands.

ANALYSIS OF ANSWERS FROM TWENTY-FIVE OTOLOGISTS AND GENERAL SURGEONS TO QUESTIONS ASKED.

Otitic Septic Sinus-thrombosis.

As the result of your own personal experience—

1. Which would you do first?—tie the internal jugular vein or expose the sigmoid sinus?

(a) When one rigor has occurred and there is some pain and stiffness of the neck without other signs of vein involvement.

(b) When rigors have been repeated and other classical symptoms have been present for several days, but there are still no local signs of the jugular vein being affected.

(c) Where there are local signs of vein thrombosis.

2. Supposing the sinus to have been exposed in condition 1 (a), perisinus abscess found and the sinus walls thickened and covered with granulations—would you explore the sinus at the same operation, and if so, how?

Would you tie the vein before exploring the sinus?

3. Do you think it is ever advisable or justifiable *not* to tie or excise the vein in conditions 1 (a) (b) (c)?

Have you any strong views based on actual experience for or against tying the vein at all in any of the above conditions?

4. What do you consider to be the best indications before opening the sinuses?

(a) Of absence of clot.

(b) Absence of endo-sinusitis.

(c) Mural septic clot with permeable sinus.

(d) Primary clotting in the bulb of the jugular vein.

5. Do you employ any special method to determine the extent of clotting, *e. g.* palpation, fluctuation from vein to sinus, or tuning-fork auscultation, and with what result?

6. Technique of operation:

(1) How do you deal with the torcular end of the sinus?

(2) How with the distal end when the vein has not been tied?

(3) Where do you tie the internal jugular vein?

(4) Do you excise a portion or the whole of the vein?

(5) If you do not excise, how do you treat the divided vein?

(6) Do you irrigate sinus and vein?

(7) If vein is excised, what drainage do you employ ?

(8) What is your experience of suppuration along the great vessels ?

(9) Do you consider that it is necessary under any condition to expose the bulb ?

(10) Have you ever ligatured both internal jugular veins or explored and obliterated both lateral sinuses ? If so, what was the result ?

(11) Have you ever found it necessary to resect the clavicle or tie the vertebral vein.

Analysis of Answers.

1. (a) 22 expose sinus only, without exploring it. 2 explore sinus then tie the vein. 1 ties the vein, then explores sinus.

(b) 2 always explore and slit up sinus only. 4 explore sinus, then tie vein. 13 explore the sinus and then tie vein if necessary. 1 exposes the vein for information. 5 tie the vein first, then explore the sinus.

(c) 1 explores sinus alone. 1 explores sinus, then opens the vein if clotted, without ligating it. 8 explore sinus first; 3 of these tie vein occasionally, 5 tie vein always. 14 tie vein first.

2. 2 never explore sinus at first operation. 18 expose sinus and wait or act according to findings. 5, if intending to explore sinus, tie vein first. 6 do not tie vein first, and 4 are doubtful.

3. 1 (a) 19 consider it justifiable *not* to tie. 1 thinks it is never justifiable not to tie the vein.

1 (b) 7 think it sometimes justifiable *not* to tie vein. 5 never justifiable. 2 never tie the vein.

1 (c) 12 think it never justifiable *not* to tie vein. 2 never tie the vein.

4. (a, b, and c) 11 gave no answer or say there are no trustworthy signs. 9 employ palpation of the sinus, with or without fluctuation, from vein to sinus. Most rely on colour, distension, pulsation, density or contour of wall, and presence or absence of systemic symptoms.

(d) Answers too varied to classify. W. S. Kerr: Delayed rigors with septic temperature chart, labyrinthine symptoms, tenderness between the jaw and mastoid. J. S. Fraser: Great bleeding during mastoid operation from bone and emissary veins. Knowles Renshaw: Healthy sinus; no fluctuation in sinus when pressure applied along vein. Hamilton A. Ballance: Pyæmia with

absence of disease about the sinus. W. S. Syme: Temperature chart, rigors, absence of upward flow into sinus. G. Wilkinson: Indications got from exposure of vein in the neck. E. M. Stockdale: Thrombosed sinus with healthy mastoid. Constable Hayes: Pain on swallowing referred to tonsillar area, associated with mastoid symptoms. T. O. Graham: Early stiffness of neck and no marked local signs around sinus at operation.

No mention is made of tuning-fork auscultation nor of absence of "bruit de diable."

Analysis of Technique.

1. 6 drain, then plug the lumen if bleeding. 2 incise, fold walls in and pack. 8 use gauze pressure pads, and 1 uses rubber sponge. 12 remove clot until blood comes. 1 leaves it alone.

2. 8 plug the lumen. 1 folds in walls and packs. 4 use gauze pressure pads. 5 remove clot until blood comes. 4 leave alone.

3. 9 above the facial vein if there is no clot below. 8 "below the clot." 6 always below the facial vein. 2 at "root of neck." 2 opposite thyroid. 2 opposite cricoid.

4. 13 excise none. 2 all. 2 "as much as possible when clot present." 5 "diseased part." 1 remainder after stitching upper end in the wound.

5. 4 double ligature, divide vein and leave in wound. 16 double ligature, divide and fasten upper end in wound. 1 inserts tube and gauze in vein (upper end). 1 uses Ballenger's stab-wound method. 1 "packs it." 3 open vein freely *in situ*.

6. 1 sinus only. 1 sinus and vein separately. 9 through from sinus to vein. 10 do not irrigate. 4 sometimes irrigate.

7. 3 gauze. 1 split rubber tube. 3 gauze within rubber tube. 1 iodoform worsted. Several did not reply.

8. 10 had never seen it. 4 considered it dangerous. 1 thought it rare, if vein brought out of wound. 1 had only a small localised abscess. 3 said it was easily cured by drainage.

9. "7 No." 2 "if bulb thrombosed." 1 thought it might be necessary, but had not done the operation. 5 when symptoms continue after complete treatment of vein and sinus. 2 when irrigation fails. 4 when extradural abscess invades jugular fossa.

10. 1 (only) *patient recovered* (Whitehead, *Proc. Roy. Soc. of Med.*, vol. xi, Otol. Sect., p. 1).

ABNORMAL STYLOID PROCESS CAUSING TONSIL IRRITATION.

BY MACLEOD YEARSLEY, F.R.C.S.,
Senior Surgeon to the Royal Ear Hospital, etc.

Miss C. D—, aged twenty-three, consulted me on October 15, 1914, complaining of "pressure in the left side of the throat." She described it as the feeling of a "bone" in the throat, and stated that she had been troubled with it for some ten or twelve years. There was also some fulness in the left ear. On examination the tonsils appeared normal, but there were remains of adenoids in the fossæ of Rosenmüller and some thickening in the left lateral wall of the pharynx. These remains of adenoids were cleared away under gas on November 16 without, however, relieving the original symptoms, except those referred to the ear. On November 28 she saw me again and described her original symptoms more fully. These amounted to actual pain about the tonsil and difficulty in producing the singing voice, as she feared to sound a high note on account of the discomfort so experienced. She placed her finger on the left tonsil to show me the exact site of the discomfort. On palpation a bony projection, apparently buried in the lower pole of the left tonsil, was distinctly to be felt. This projection was pointed, and situated just behind the ramus of the jaw. The possibility of a long and abnormally curved styloid process occurred to me, and an operation was decided upon.

On December 8 the patient was anaesthetised in the sitting position by Dr. Howard Jones, and the left tonsil was dissected out. A projecting point of bone was thus laid bare which was evidently the incurved end of a long styloid process. This was reduced with punch forceps in three pieces, about three quarters of an inch in all being removed. The patient made an uneventful recovery. Since the operation all the symptoms complained of have completely disappeared, and the singing voice has greatly improved alike in production and compass.

My object in publishing this case is that I am unaware of any such abnormality having been diagnosed beforehand and a special operation devised for its relief.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—OTOLOGICAL SECTION.

November 20, 1914.

DR. ALBERT A. GRAY, *President of the Section, in the Chair.*

Presidential Address.

GENTLEMEN.—The problems in otology already solved by otologists are very considerable. If we look back twenty or thirty years and remember how little we knew and what a small amount we could do, even for a case of suppuration of the middle ear, to relieve patients from their ultimate fate, and when we see such cases now treated successfully, both by means of operation and without, we shall appreciate how much advance has been made. We must consider how many lives have been saved, and how frequently hearing has been restored, or at all events improved. This certainly gives us hope for the future.

But we have now to consider what difficult problems lie before us. Take the cases unassociated with suppuration or with catarrhal conditions; how very misty the subject appears to us. We may first try to explain why it is that there is such a sharp line between those cases associated with catarrh or discharge on the one hand, in which we can forecast complications and do something to alleviate, and those cases, on the other hand, concerning which we are still very much in the dark. I think the explanation will be found to be this: With the discoveries of Pasteur and Lister of the influence of micro-organisms in producing disease the whole medical profession began at once to turn their energies into that channel. Bacteria received great attention, with the most wonderful results in all branches of medicine. Innumerable investigators sprang up to make a special study of this subject, and we know what remarkable consequences have followed. It has been said that there is the soul of good even in things evil. I submit that it is equally true that there is the soul of evil even in things good, because this extraordinary development of bacteriology entirely absorbed minds which might otherwise have devoted their attention to other aspects of pathology. Consequently, for many years the tissues and their manner of response to the invading bacteria were practically left out of consideration. The bacteria were considered as everything, the man as nothing. But, obviously, there cannot be disease without an animal—man or other. Disease, after all, is response to injury, whether by toxins of bacteria or other origin, or by chemical or physical agents. Therefore, the outstanding factor is not the organism or the poison, but the tissue that responds. If individuals were exact replicas of each other, then the same disease would always present exactly the same clinical phenomena. Cases of pneumonia would always have the same temperature, and the rise and the crisis would occur on the same day, the same hour. But no two individuals are alike! Consequently, when a poison or an injury affects the tissues we may give the condition a certain name, but it is never in the strict sense the same disease in all.

There are, however, a number of diseases which, apparently, can only affect certain individuals, whatever the environment may be; and in regard to these diseases we may say that the individual is by far the more important factor, the environment the less important. We may take, as an extreme example, Daltonism. No unfavourable environment will make the ordinary human being the subject of Daltonism. The condition must be innate, that is, inherited from parents or ancestors, or arising spontaneously. A much less extreme example, but still very noticeable, is arteriosclerosis. No doubt the majority of people can be made to suffer from arteriosclerosis; but a certain percentage of individuals might subject themselves to all kinds of unfavourable conditions, lead outrageous lives, and dissipate themselves in many ways, and yet live to a green old age! Others, though living careful and well-ordered lives, may suffer from arteriosclerosis in comparative youth. A disease of which we see a good deal in otology is otosclerosis, and it is similar to arteriosclerosis in this respect: It may appear in generation after generation of a family, though the victims may live in the most perfect surroundings, and with no apparent external cause acting at all. It seems as though in such individuals the tendency in the fertilised ovum is so strong that the disease will come into existence, no matter what the environment may be. In spite of this, it remains true that in a large number of cases unfavourable circumstances are undoubtedly effective in producing otosclerosis. I am sure all of us must have seen cases of otosclerosis in which the exciting cause has been typhoid fever, prolonged anemia in the form of chlorosis, pregnancy, and several other conditions. On the other hand, how very few people suffering from these general conditions become otosclerotics. It is obvious, therefore, that in otosclerosis the personal equation in large part determines the onset of the disease.

The question arises, why should that be? The tendency must be inherent, and must be passed down from parent to offspring. And yet if we try to arrange these cases of otosclerosis in accordance with the so-called Mendelian principle, we shall find that they do not group themselves in the way that colours of plants and heights of peas and beans do—characters which apparently do follow the Mendelian law. In otosclerosis we find the expected numbers are sometimes diminished, sometimes exceeded; and the same is true of arteriosclerosis.

In regard to inherited neuroses, Dr. Mott has a very interesting paper in the *Archives of Neurology*,¹ and he came to the conclusion that these conditions cannot be brought into relationship with Mendel's law. And yet there is no doubt that the Mendelian law, generally speaking, is true in regard to certain characters. As far as I can make out, Mendel's law applies to those hereditary conditions which are part and parcel of the race or species. For example, Mendel mixed a pure strain of short peas with one of tall peas, and of the offspring some were tall, some short, but none medium. Shortness and tallness, however, are inherited qualities, and they are destined to appear from the beginning. The same is true of such a condition as night-blindness and Daltonism; they are, clearly, inherited conditions absolutely independent of any external agency or environment. Consequently, those oculists and biologists who have examined into the inheritance of night-blindness and Daltonism find that those conditions do come under the Mendelian law. But when we take arteriosclerosis, otosclerosis, and the neuroses, we find that they do

¹ *Arch. of Neurol. and Psych.*, 1914, vi, pp. 79-98.

not come within that law. The reason, I venture to think, is not very difficult to find: it is that these pathological conditions are to a certain extent dependent on external environment: they are only *potentially* going to occur. The individual, with few exceptions, is not definitely destined to suffer from arteriosclerosis, for a considerable number of the cases depend upon some unfavourable environment.

If we probe still further into this matter, we shall find that those diseases in which the condition only occurs when, in addition to an innate tendency, a certain environment is also necessary are characterised anatomically by the fact that the process of repair is deflected from its normal course. For instance, in the case of arteriosclerosis, such a poison as lead introduced into the system will act on the arterial walls and cause injury. Consequently, certain cells will divide and multiply, probably a great many are destroyed, and some of the highly specialised cells, which have comparatively little power of reproduction, will be at a great disadvantage compared with those of the fibrous tissues, which have great capacity for reproduction. Hence the individual will begin to have an increase in the fibrous elements in the walls of his arteries, and a decrease in the more highly specialised muscular ones. Therefore, it is not surprising that such diseases do not manifest the Mendelian principle: they depend to a certain extent on some unfavourable environment. The individual who is liable to suffer from arteriosclerosis and otosclerosis, because of his inherited tendency, needs also that other conditions should come into play before the disease will come into existence. Even malignant disease, if we take it locally, indicates to a certain slight extent an inherited tendency. But irritation of the part will establish the disease when it might not otherwise have shown itself.

My remarks, I fear, have been rather disjointed, but I cannot help thinking that the line of future study, not of otology only, but of pathology in general, lies in a consideration of the tissue cells—as to why they undergo certain changes.

We talk of repair, but what is the biological significance of the process of repair? Taking the case of repair of a wound in the skin, we have a fair idea of *how* that process takes place. We know how the fibrous tissue cells divide, we know how the leucocytes come from the blood-vessels, how the epithelial cells grow and form a harmonious union of the connective tissue cells, and so on. We know that the epithelial cells change their character and become phagocytic, and the same is true of the fibrous tissue cells. That is to say, we have a fairly good knowledge as to *how* repair takes place. But, curiously enough, I have never, in all my reading and in all my communications with pathologists and physicians, heard the question asked, "*Why* does a wound heal?" Why, when we injure the tissues, does repair take place at all? That is the problem before pathology. Why does not the wound remain open as a raw surface?

When we solve the problem as to why repair occurs under normal conditions we may be in a position to say why it does not occur in certain other conditions, such as malignant disease, arteriosclerosis, otosclerosis, and many more. We shall not solve the problems of pathology by knowing *how* repair is carried out, although that is extremely important: we shall have to know *why* it is carried out.

The problem will be difficult to solve, because no amount of observation of clinical facts or physiological or pathological experiments in laboratories or outside of them will suffice. What is required is the highest of all the intellectual qualities—imagination.

Cerebello-pontine Tumour.—**W. M. Mollison**.¹—The brain of the patient shown to the Section last year; the patient having died some weeks after operation. A tumour is seen occupying the base of the brain mainly about the left cerebello-pontine angle; there is an extensive hæmorrhage into the growth, and occupying the left-hand side of the mass is a cystic cavity (opened at the operation). Microscopically the growth is a glioma.

Mr. C. E. WEST said the point in the case which particularly interested him was the distension of the upper and lateral part of the fourth ventricle, simulating a cyst. Presumably it was cerebro-spinal fluid, not cystic fluid in the sense of the contents of a cystic growth, which ran out of the wound. He doubted death from exhaustion if by that was meant exhaustion due to loss of cerebro-spinal fluid, unless the patient showed signs of inadequate fluid in a general way, similar to those of continued hæmorrhage. He once nearly killed a patient by withdrawing a large quantity of cerebro-spinal fluid, but she rallied and recovered, and, he thought, was still alive. He had withdrawn as much as 500 c.c. of that fluid in twenty-four hours without the patient showing signs of distress, and if the patient were kept well supplied with fluid he could stand great drains of his cerebro-spinal fluid. Mr. Mollison presumed against himself that there was some infection of the meninges in this case, but the specimen did not show any grounds for that conclusion. Such patients as these died, and on the *post-mortem* table one could not say why, and that was particularly true of malignant cases. One case which he saw, but did not attempt to operate upon, had vertigo as the earliest symptom, and was pronounced inoperable by a very eminent cranial surgeon in London. After exploration he was subjected to X-rays through a decompression opening in the occipital region repeatedly. He was a student, and that was done two and a half years ago. Since then the patient had qualified.

Mr. G. J. JENKINS said the point of interest to him, as it had been to Mr. West, was the association of a tumour and a cyst, and he asked whether Mr. Mollison could offer any explanation or suggestion to account for that association. It was curious that the whole of the fourth ventricle was dilated, and that the dilatation involved the left lateral recess of the ventricle—in the region of the cornucopia. It was possible that this recess had formed the cyst. It was difficult to see the anatomical formation in the specimen, but the association of cyst and tumour was interesting. Might there be a section of the lining membrane of the cyst? as it would be important to know its histology in coming to a conclusion as to the nature of the cyst.

Mr. MOLLISON replied that Dr. Wyatt Wingrave told him before the discussion that he had a similar case, which was a papilloma of the choroidal plexus, and that microscopically it was either an endothelioma or an epithelioma. In the light of that knowledge, perhaps one might change one's diagnosis in this case to endothelioma; though the microscopical difference between the two was a very subtle one. Dr. Johnson, who had specialised in the pathology of the brain, reported it was a glioma, with neuroglial elements in it. He would read Dr. Johnson's report: "Histologically the tumour exhibits the structure of a glioma. In parts the section shows typical neuroglial formation. The ground substance consists of a delicate protoplasmic network formed by the branching processes of the tumour cells. The nuclei of these latter are

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxix, p. 315.

large and well defined, and are surrounded by a thin layer of protoplasm. Occasionally small areas of degeneration occur, which appear to be early collections of fluid between the cells. In other places, possibly the more rapidly growing portions of the tumour, the cells are more closely packed, and the ground substance is proportionately less. Here the appearance approximates somewhat to a sarcomatous condition. This tendency, however, is insufficient to justify the application of the term 'gliosarcoma' to the specimen." Dr. Johnson mentioned that there was some degeneration, with fluid between the cells, so a possible explanation of the cyst would be that it was an extension of that process over a large area. Mr. Jenkins made to him an excellent suggestion for the presence of the fluid, namely, that there was some nipping by the growth of the choroidal plexus, and consequently a kind of oedema behind.

Syphilitic Ulceration of the External Auditory Meatus.—**W. M. Mollison.**—W. C.—, aged thirty-two, has been attending as an out-patient, suffering from a chancre. This has been treated by means of mercurial injections. Six weeks ago a boil appeared in the left ear; this has been discharging ever since. The external auditory meatus and tragus on the left side are the seat of an ulceration. The meatus is so filled with flabby granulations that the membrane cannot be seen. There seems to be little or no pain in connection with the ulceration. The soft palate shows a condition of superficial ulceration.

Slides illustrating Lumbar Puncture Fluid in Aural Cases.—**Wyatt Wingrave.**—Cerebro-spinal infection in *chronic* aural cases is usually polymicrobial; in *acute* cases mon-microbial. Lumbar puncture for first or even second "tap" is often negative, due partly to localisation or to slow circulation of fluid. Chemical and physical characters are also profoundly affected; their significance consists in absence of sugar, presence of acid, increase in specific gravity. Early appearance of cytological changes in labyrinthine complications.

Carcinoma of the Pinna.—**C. E. West.**—W. A.—, aged sixty-nine, male. Seven years ago patient had a hard wart on the left cheek. This was excised, but returned quickly. It was destroyed by carbon dioxide snow and has not returned. For several years he has had a warty growth on the dorsum of the wrist, and lately a small papilloma at the inner canthus of the right eye. Eighteen months ago a small ulcer appeared on the left ear; this has rapidly increased lately. Patient has not used tobacco and alcohol for thirty-four years. Blood gives a negative Wassermann reaction. On admission to hospital, September 4, 1914, there was a large, ulcerated, septic growth involving the inner aspect of the tragus, the external meatus and concha on the left side. The tissues on the posterior aspect of the pinna and over the mastoid region were cedematous and brawny, and one or two small glands could be felt in the upper part of the anterior triangle of the neck.

Operation, September 9: A racket-shaped incision was carried round the pinna, including the area of the mastoid and about three-quarters of an inch of the skin of the cheek. The skin was raised anteriorly up to the margin of the parotid, and the superficial tissues were dissected from the gland with the parotid fascia backwards to the meatus. Above, the tissues were raised down to the temporal fascia, and behind down to the bone. When the meatus was reached, this was separated from the bone, and the pinna removed with the surrounding tissues *en bloc*. An extensive

radical mastoid operation was now carried out, with a wide exposure of dura mater above and the removal of the whole of the bony walls of the meatus except a small part of the deepest portion of the floor. The facial nerve was not exposed in this part of the operation. The handle of the racket was now lengthened for some 3 in. over the sterno-mastoid, the muscle was detached from the bone, turned down, and transfixed and ligatured and cut away. Beginning from the under surface of the petrous, the substerno-mastoid tissues were dissected off the carotid and jugular, and as far forward as the attachment of the stylomandibular ligament and posteriorly from the apex of the posterior triangle, and this dissection was carried down as far as the level of the cricoid cartilage, in a continuous sheet. The neck wound was closed and drained at the lower end. Some branches of the facial nerve were known to have been divided at their exit from the parotid, and it is probable that the trunk of the nerve was injured in the deep dissection on the under surface of the petrous. The wound granulated well, the edges rapidly drawing in, and on October 21 the cavity was lightly curetted under cocaine and adrenalin and a graft applied. There was at first a considerable diffuse induration round the cut end of the sterno-mastoid, but this has gradually diminished.

The case is shown as an illustration of the removal of a primary growth with its surrounding area and lymphatic territory in continuity. The amputated pinna and a section of one of the glands in the mass of tissue from the neck were exhibited.

Mr. West added that, as he said in the notes, the case was shown to illustrate the removal of a primary growth with its surrounding area and lymphatic territory in continuity. Both the partial success and the ultimate failure hinged upon that. He ought further to say that the man had that afternoon been demonstrated to have palpable glands above the left clavicle. The ideal thing to have done in such a case was to do a complete dissection beneath the sterno-mastoid and in the whole of the posterior triangle at the original operation, and as this patient showed very little bad effect from the operation, he believed he would have stood that being done. But the difficulty would be to get him up to the operating table a second time, even though he was so grateful for the relief which had been given him. It illustrated how wide an area ought to be included in the operation in these cases, either all at the primary operation or as an immediate sequel, in order to secure freedom from recurrence.

Mr. G. J. JENKINS considered that the result was a remarkably fine one for such a condition. The patient was of the type in which recurrences were apt to take place: the multiple papillomata indicated his cancerous tendency. In infirmaries these people were looked upon as likely subjects for cancer. This patient had had papillomata, some of which had been cured by radium.

The PRESIDENT said that even though recurrence might take place, and indeed probably would, the great point was that the terrible condition had been obviated which ensued from ulceration about the meatus, which involved the bone. Even if he had recurrence in the glands near the clavicle, he would not suffer as he would have done had the operation not been undertaken. The way in which the grafting succeeded was particularly fortunate, and showed how thoroughly the malignant tissue must have been eradicated.

Mr. C. E. WEST confessed that, personally, he fought malignant disease to win, not merely to delay death: consequently he was dis-

appointed at the signs of recurrence. He agreed with Mr. Jenkins that this patient was a typical example of the type of person who developed squamous carcinoma in some part, and one who was likely to have a local recurrence. But he did not feel that this absolved him from the disappointment that there should be a recurrence in the glands, because he did not think glandular recurrence had a bearing on the question of the liability of a new primary epithelioma developing if the patient should live long enough.

A Cold-air Labyrinth Testing Apparatus.—J. Dundas Grant.—

The apparatus consists of a metal tube covered with an absorbent linen webbing and coiled in the form of a hollow cone. The free extremities of the tube are insulated by means of rubber tubing, of which a portion projects beyond the metal for insertion in the ear; the distal part of this is separated from the rest and can be easily changed to meet aesthetic or



aseptic requirements. The absorbent covering is well wetted with chloride of ethyl, and air is then blown through the tube by means of an ordinary spray bellows. In order to make the flow of air gentle and continuous it was found necessary to use a fairly strong secondary bag to the bellows and to choke very considerably the bore of the proximal end of the metal tube. When the air blown on the cheek is felt to have reached a high degree of coldness, the tube is introduced into the meatus of the ear so that the cold blast impinges directly on the tympanic membrane. Inflation is continued until nystagmus is, or ought to be, induced.

When the instrument is thus arranged the maximum of coldness is obtainable in from twelve to fifteen seconds and is kept up for about seventy-five seconds, when more chloride of ethyl can be added easily. In most normal cases the nystagmus is induced in an average of thirty seconds, the head being thrown back 60° beyond the vertical and the eyes being intermittently directed towards the opposite side at an angle of 50° from the middle line (Brüning's optimum position) and up to the ceiling.

The PRESIDENT asked whether there was any possibility of doing

harm to the membrane by such an apparatus. The use of ether, of course, would bring the air down almost to freezing temperature. He supposed that when it was put into practice the test would be standardised.

Dr. URBAN PRITCHARD referred to a case in which it was intended to incise the membrane, but the surgeon thought he would try local anæsthesia. He sprayed in the ether, and the patient dropped to the floor immediately, and the process had to be stopped.

Mr. O'MALLEY said that three years ago, in Vienna, he had an opportunity of using a somewhat similar apparatus, which was devised by Bárány. It had the usual spraying apparatus, with a double channel tube passing into a bottle which had some ether at the bottom. But this apparatus of Dr. Grant's seemed to be a considerable improvement on Bárány's, because it only impinged cold air on the meatal wall, whereas in Bárány's apparatus ether vapour accompanied the cold air, and he did not think it was wise to introduce a drug in vaporised form into the ear. Bárány devised it for use in cases of perforation of the tympanic membrane, in which he did not like to use cold water for fear of setting up otitis media. He questioned the advisability of introducing sudden cold to the membrane, and through that to the labyrinth.

Dr. JOBSON HORNE considered it would be advisable to know the effects of ethyl chloride in a cold-air labyrinth testing apparatus upon the normal subject before gauging its clinical value in disease. Doubtless time would show that the instrument had its usefulness and also its limitations and contra-indications.

Mr. E. D. DAVIS asked Dr. Grant if his apparatus could be modified for the use of hot air in addition to cold. It was suggested that a movable chamber for hot water could be placed within the spiral tube.

Dr. DUNDAS GRANT replied that he had seen no harm result from the use of the apparatus. He could conceive such occurring as the result of spraying ether into the ear, as had been suggested by some writers. The lowest temperature he had obtained, tested by a thermometer, was 44.6° F., or 7.4° C, which was still considerably above freezing temperature. In reply to Dr. Jobson Horne, nystagmus, in Brüning's position, was caused in about twenty-eight seconds after the apparatus had been well cooled. After compression during ten or twelve seconds it was found to be quite cold to the cheek. In about twenty-eight to thirty-two seconds later (the time at which nystagmus appeared normally to occur) the temperature was down to about 48° F. He agreed it might advisably be standardised in detail, and he had tabulated the rise and fall as observed at intervals of five seconds. The idea of using it also for heated air had occurred to him, but he had as yet done nothing to carry the idea out. The essential feature of the apparatus exhibited was its portability and convenience.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

November 6, 1914.

Dr. G. WILLIAM HILL, *President, in the Chair.*

Fracture-dislocation of Right Great Cornu of Hyoid Bone.—

G. William Hill.—This man fell off a bicycle one year ago and contused his neck. Pain for some days on left side. The right cornu was now seen projecting into the right glosso-epiglottic fossa. The man had suffered from laryngitis with hoarseness ever since the accident.

Skiagrams of Frontal Sinuses operated on by Good's Method.—

G. William Hill.—Dr. Watson-Williams's metal sounds were seen *in situ*. Good's bone files or rasps for enlarging the frontal ostium were exhibited. Dr. Hill had recently performed Good's type of per-nasal operation for enlarging the frontal ostium on five frontal sinuses, using Good's special bone rasps, which he had just exhibited. The technique appeared to be both easy and safe. It was too early to speak of the permanent results, but the immediate relief was surprisingly good. No doubt in some cases a larger and more direct opening could be obtained by Dr. Watson-Williams's drill and burr, and by other modifications of Ingals's original instruments, which were exhibited many years ago by Dr. Dundas Grant.

Skiagram of Frontal Region, showing Symmetrical Fronto-ethmoidal Cells extending above Roof of Orbit.—

G. William Hill.—In reference to this skiagram, showing accessory fronto-ethmoidal cells extending far outwards between the frontal sinus floor and roof of the orbit, it had been assumed hitherto that the occasional presence of these cells, first described by Sir StClair Thomson under the name "orbito-ethmoidal," could only be ascertained by the Killian technique, and this assumption had been used as an argument for the inadequacy of the Ogston type of operation. The cells, however, could be seen by radiography quite clearly, and could be at least drained by Good's type of operation.

Breaking down of the Inter-frontal Sinus Septum by the Nasal Route so as to ensure Lavage for Double Frontal Sinus Suppuration.—

P. Watson-Williams.—Four skiagrams were shown. Dr. Watson-Williams pointed out that the rasp or sound shown passing up one fronto-nasal passage and through the inter-sinus septum to the opposite side appeared to be traversing the sinus septum lower down than was actually the case, this illusion being due to the fact that the head was tilted back, hence everything in a plane posterior to the anterior surface of the sinus of course would appear lower in a skiagram than the corresponding part of the anterior sinus wall.

Dr. DUNDAS GRANT said it was pleasing to him to see the growing tendency towards the treatment of the frontal sinus by the intranasal method. When years ago he uttered an opinion in favour of it, there was a smile on the faces of the listeners. He might claim some priority in regard to the method just described, because at their meeting in

Sheffield he brought forward an identical frontal sinus bougie, and narrated some cases in which he had found those bougies of considerable benefit. The only change necessary was to have the instruments made more pliable. The rasp was a great addition, and he recently used it in a case with much satisfaction, and he approached closer to guaranteeing a natural sized opening than he had done before. Rasps and burrs, however, were apt to provoke considerable granulation, compared with chisels and other clean-cutting instruments. Mr. Tilley had stated how



Skiagram showing the author's small frontal sinus rasp passed into the (patient's) left frontal sinus, and, through the large hole it has made in the sinus septum, well into the opposite frontal sinus (the skiagram reverses the right and left sides).

useful he found strong solutions of nitrate of silver: strong solutions of argyrol were also very good. Also one might use scarlet-red ointment. In a recent frontal sinus case he thought it materially assisted epithelialisation on the surface of the opening. In some of the cases on which he had operated radically he found that even then the passage contracted, and he had been glad to resort to his frontal sinus bougies. In a recent case he used them for what he thought to be mucocoele. There was distension in the upper and inner angle of the orbit, and it was feared that it might be a new growth. On opening externally, he found he could secure no passage into the nose. But he forced a passage and then

introduced the rasp. Following the example of Dr. Watson-Williams, he used a backward-cutting punch, such as had long been used for the antrum, and found it acted extremely well in removing the crest on the posterior surface of the nasal bone, and with scarlet-red ointment the passage was kept smooth and free.

Mr. TILLEY said he would like to ask Dr. Watson-Williams to keep a very special record of the cases in which the inter-sinus septum had been perforated, in order to compare the results with those which had not thus been operated on. It was difficult to see how merely making a perforation between the two sinuses could expedite a rapid cure and a relief of symptoms. It was often one's experience to see pus return from one sinus when the other was irrigated. He had never been able to convince himself that the cases in which perforation had been caused by disease got better any quicker than did those in which the septum separated the two diseased sinuses. Only within the last two months he had had a patient in whom the sinuses communicated. There was a fronto-nasal canal into both frontal sinuses almost big enough to admit a cedar pencil, and on syringing up one the fluid flowed freely down the other. Nothing seemed to stop the suppuration, not even the employment of strong antiseptics. If one broke down the inter-sinus septum, one must chip off portions of bone, and he would like to know what happened to these. Did they get blown down, washed down, or did they slowly disintegrate within the sinus?

Dr. WATSON-WILLIAMS had used Dr. Grant's sounds, and they were useful up to a certain point. But the difficulty was that they merely dilated by stretching the parts, which consequently fell together almost as soon as the sound was withdrawn. In reply to Mr. Tilley, he did not think there would be any more difficulty with these small pieces of bone from the septum than with those from the rasped ethmoidal cells. Either they remained attached to muco-periosteum and would not necrose, or, if loose, they would become washed away. He agreed that if one got the frontal sinus so well open that a good flush could be procured by washing one sinus, there was no necessity for opening the septum. But both these cases had hung fire very much, although he had made a good opening into them; in each case they had very much improved since the free openings had been made in the frontal sinus septum, allowing, not only of a very free flush through, but also of better atmospheric ventilation.

Laryngeal Disease of Obscure Nature.—W. Jobson Horne.—

A man, aged thirty-six, had had no throat affection until Christmas, 1913, when he had laryngitis; since then there had been hoarseness and almost loss of voice for five months. Three or four months ago there was dysphagia, when only slops could be taken. There is no history of lues or phthisis. The tongue is protruded to the left. An overhanging epiglottis, which is normal, makes it difficult to see the vocal cords, which are almost hidden by the ventricular bands. There appears to be impaired mobility of the left cord.

Dr. GRANT said there was paralysis of the left vocal cord, and loss of function of the left hypoglossal nerve, while the pharyngeal branch of the vagus seemed to have escaped. If there were assumed to be a growth in the medulla, a remarkable point was that with paralysis of the left half of the tongue there seemed to be no wasting of the muscle, such as would ensue if it were due to infra-nuclear disease.

Dr. D. R. PATERSON thought the loss of voice was largely due to

approximation of the ventricular bands, and the question arose whether anything should be done for that, as it considerably interfered with the vibration of the true cords. He had had experience of such cases, and they seemed to be particularly unsatisfactory where the false cords were much thickened. Painting them with astringents failed to yield good results. It seemed to him that this aspect of the case was well worthy of discussion.

Dr. FITZGERALD POWELL thought that, in view of the paralysis of the tongue, central nervous trouble was to be feared.

Dr. JOHNSON HORNE, in his reply, stated that the larynx had undergone considerable change since the one occasion upon which he had seen it. At that time, owing to the œdema of the ventricular bands, it was difficult to see the vocal cords. Rest of voice was enjoined, with the result that now it was possible, not only to see the vocal cords, but also to see that there was ulceration on the glottic aspect of the left arytenoid region, perhaps more extensive than the mirror showed. Although there was no history of lues obtainable, he would nevertheless advise that a Wassermann test be done and the future treatment of the case be based upon the result.

Abnormal Overgrowth of Nose (Bulbous) in a Child, aged two.
—J. L. Irwin Moore.—This case was sent to me at the London Throat



Abnormal overgrowth of nose (side view).

Hospital. The child was born in this condition. Dr. Worthington, of Exeter, who was consulted, writes me as follows:

"This case was brought to me about a year and a half ago with a tumour at the end of its nose much the same in appearance as it is now. I thought the swelling was cystic, and that it might be a dermoid in an unusual situation. I found on cutting on to it, however, that it consisted of fine fibrous tissue, closely adherent to the skin and also to the perichondrium of the cartilage of the alæ. There was no capsule and no definite limitation whatever. I removed as much as I could in an

attempt to at any rate make a more shapely nose. But it was a very difficult and unsatisfactory job, for the whole face was on a much smaller scale than it is now. The wound healed well, and the appearance was certainly improved, but the tumour again slowly recurred until in proportion it was just the same as before. I have seen the case again off and on since last February, and I am sure that it has not grown any larger since then. After carefully considering all the possibilities, I have declined to operate again, as, short of cutting off the end of the nose, I do not think removal is practicable, and partial removal my experience has shown to be of no avail. You will notice that the substance of the growth comes well on to the columella in front."

The PRESIDENT said he would have thought the case might well have been operated upon again, and the tip of the nose considerably reduced. Mr. Graham had operated upon a similar case with success.

Dr. JOHNSON HORNE advocated waiting to see if the abnormal portion of the nose kept pace in growth with the rest of the nose. If it did not, in time the nose might outgrow the abnormality, and operative interference for cosmetic or æsthetic purposes would be unnecessary.

Mr. HARMER said the case was an admirable one for diathermy, which could be performed without shock to the child, and without causing much scarring.

Hill's Feeding-tube in Epithelioma of the Œsophagus.—J. L. Irwin Moore.—Radiograms showed the stricture and dilatation of the Œsophagus above it. Patient had dysphagia for two months, and when first seen on September 18 he had lost 37 lb. in weight. Solid or semi-solid food if swallowed was soon vomited. He could only take liquid food. There was a large secretion of mucus day and night, of which he vomited a breakfast-cupful at a time. The tube has remained *in situ* for seven weeks, and food is retained. He can now swallow liquids by the mouth without discomfort. He is relieved of the mucous secretion. He is gaining in weight, is comfortable and in good spirits, and able to do his daily work.

Dr. D. R. PATERSON asked whether these tubes had been found useful in malignant disease at the entrance of the Œsophagus, where the difficulty caused by inability to swallow the saliva was very annoying.

Mr. ROSE asked whether these tubes had been used for cases of non-malignant stricture, and whether there was a tendency for such strictures to dilate whilst the tubes were being worn.

The PRESIDENT said that in his experience these styleted tubes were not well tolerated in all post-cricoid cases. Symonds's soft rubber tubes should always be tried first in those cases—the long tube, not the funnel; but they were liable to be coughed up or vomited. That occurred in a case of his that very day, and a styleted tube had to be substituted. He used these tubes for their bougie effect in cases of non-malignant stricture, and they usually acted very well. If not, they could be dilated more drastically afterwards with a Brüning's dilator.

Dr. IRWIN MOORE replied that the case showed the great advantage of feeding such cases by means of Dr. William Hill's oro-Œsophageal tube, especially from the patient's point of view. When he first saw the patient on September 18 he had lost 37 lb., was very miserable from starvation, and practically ready for gastrostomy. He had had no food for four days; liquids, which he had previously been able to swallow, being vomited almost as soon as swallowed. He could now take nine pints of food in twenty-four hours, consisting of beef-tea, milk, custards

Benger's food, and light boiled eggs—a considerable portion of which (during the past two weeks) he had been able to swallow by the mouth, and alongside of the tube. He had put on 6 lb. in weight in seven weeks.

Perithelioma of the Pharynx.—J. Coubro Potter.—Dr. POTTER said that the case was referred from the May meeting for a report.¹ The diagnosis had been confirmed by Mr. Shattock, as follows:

Report upon a Nasopharyngeal Tumour referred for opinion from the Section.—The neoplasm consists of groups of tortuous, closely-packed, well-defined columns of cells. Many of these exhibit a lumen, which is in some cases empty, and in others holds a finely granular or homogeneous coagulum, which has slightly shrunken from the containing space. Some of the channels are wide and complex. The lumen of the different spaces is lined with a flat-celled endothelium, the cells on the outer aspect of which are cuboidal or columnar. Channels with similar structureless contents occur in certain areas of the connective-tissue, but furnished only with a flat endothelium; this indicates that the flattened lining elsewhere is not the result of pressure arising from the central formation of a degeneration product, but represents a proper endothelium. The new growth falls into the class of perithelioma, the channels being, presumably, of lymphatic origin.

Brain Abscess secondary to Frontal Sinus Suppuration; Drainage; Recovery.—Dan McKenzie.—The patient, a young man, aged twenty-seven, was brought to hospital with a fistula in the right eyebrow leading into the frontal sinus of that side. The history was as follows: Six weeks before, the patient, who had for long been the subject of a purulent discharge from the nose, suddenly developed an abscess in the right upper orbital region with high fever and some delirium. After the abscess had been freely opened, however, these constitutional symptoms rapidly disappeared and the patient got well enough to go to business, to frequent football matches, and to lead an altogether normal life. As the fistula did not close, however, he was brought to hospital. An X-ray examination having been made, the patient was admitted for operation. The X-ray plate on this occasion showed a "normal," that is an air-filled sinus. After he had been put under chloroform I inserted a probe into the frontal sinus through the fistulous opening and was surprised to find that it passed an unusually long way into the cavity of the skull, so that it seemed as if it were an enormous frontal sinus we had to deal with. But on opening up the sinus we found it to be quite a small one, with a second fistulous opening in its posterior wall leading to a large abscess, seemingly within the frontal lobe. About 6 dr. of fetid pus was evacuated. The fistula having been slightly enlarged, a drainage-tube was placed in the abscess cavity with its outer end projecting from the supra-orbital wound. The *débris* removed from the abscess was reported by Dr. Wyatt Wingrave to contain cerebral cortical tissue.

The patient did very well. No untoward symptoms made their appearance, and, a month later, being undecided as to how long the drainage-tube, which I had meanwhile shortened a little, should be retained, I re-opened the sinus to find the brain abscess cavity apparently obliterated and the tube lying amid granulations. It was therefore removed, and, after another tube had been inserted through the infundibulum and out at the anterior nares so as to drain the sinus, the forehead wound was entirely sutured. Six weeks later the maxillary antrum, which

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., January, 1915, p. 48.

was also the seat of suppuration, was opened and drained. The patient now seems to be quite well.

The only symptom which might have been due to the brain abscess was a rather low pulse-rate, about 60. There was no appreciable interference with the intellectual powers; no change in the optic disc; no emotional disturbances, and no paretic or paralytic phenomena.

X-ray plates (by Dr. Ironside Bruce), showing a probe in the abscess cavity, were on exhibition (Figs. 1 and 2).



FIG. 1.—Abscess of frontal lobe. Probe in abscess cavity inserted through the frontal sinus. (Antero-posterior view.)

MR. HORSFORD had operated upon a case a year ago for extensive nasal suppuration, double antral and ethmoidal. About three weeks ago he was asked to see the patient again. Recently he had had frontal and occipital headache, disturbance of gait, and a tendency to fall forward. He had found that the left sphenoidal sinus was diseased, and he opened it freely. There was relief of the posterior headache, but the other symptoms persisted. The right sphenoidal sinus was also diseased. He had slow cerebation, a tendency to fall forward and latterly to fall backward, indefinite headache, a pulse-rate of only 50 to 66, a subnormal temperature, and, in fact, most of the symptoms pointing to cerebral disease. Dr. Risien Russell thought there were definite, though slight, signs pointing to frontal abscess. Mr. Donald Armour explored the skull in that region,

and opened the frontal sinus on that side, but found but little disease of the frontal sinus and no frontal abscess. Nothing further was done, and the patient died next day. *Post mortem* there was found an extradural effusion of clear fluid in two places in the anterior fossa on the right side, and nothing else abnormal. This case showed the difficulty in the diagnosis of cerebral complications of nasal disease.



FIG. 2.—Abscess of frontal lobe. Probe in abscess cavity, inserted through the frontal sinus. (Lateral view.)

Major P. G. GOLDSMITH (Canadian Army Medical Corps) said the result drew one's attention to the fact that suppuration might exist in the frontal sinus with but few symptoms, especially if there were no meningitis. He saw a case in which the patient died of acute osteo-myelitis of the frontal bone with orbital phlegmon following a radical frontal sinus operation. There was found *post mortem* an abscess larger than a walnut, with thick walls. There had been only slight headache, no nausea, nor optic neuritis, nor was there any apparent communication between the suppurating sinus and the dura or abscess.

Sir STCLAIR THOMSON pointed out that the condition was not due to operation, and for their own sakes members should bear these things in

mind. He had a case in hospital in which he operated upon a frontal sinus, and it appeared to be doing well. But the patient then developed symptoms pointing to an abscess in the frontal lobe on the opposite side. A *post mortem* revealed a lateral abscess in the brain on the untouched side. In private practice it was possible that the surgeon might be blamed for what was in no sense due to operative traumatism.

Aspergillosis on the Maxillary Antrum.—Herbert Tilley.—This communication will appear as an original article in a later number of the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

Intrinsic Epithelioma of the Larynx, suitable for Laryngofissure.—Sir StClair Thomson.—The patient, aged sixty-nine, complained of absolutely nothing except hoarseness, which has been coming on for six months. The whole of the left vocal cord is replaced by a red, knobby, ulcerating infiltration; the cords move well; the rest of the larynx is quite normal; there are no enlarged glands. The Wassermann reaction is negative. Patient weighs 13 st. 6 lb. There are no indications of tubercle. He is a non-smoker. The case is shown to illustrate the difficulty of diagnosing certain cases of epithelioma of the vocal cord. The infiltration is not suitable for removing a portion for microscopical examination, and the diagnosis therefore depends entirely on the naked-eye appearances and on exclusion of other possibilities. It is proposed to treat the case by laryngo-fissure, for which it seems eminently suitable.

Mr. HERBERT TILLEY said he did not think there was any doubt about the diagnosis. It was one of the clearest cases showing freedom of the cord in malignant disease which he had seen.

Sir FELIX SEMON said that he regretted he had not seen the case himself, but as it was stated that the whole of the left vocal cord was replaced by a red knobby ulceration, he thought that operation should not be delayed longer, as this could only increase the gravity of the operation. At the same time, hearing that the mobility of the cord, in spite of the extent of the disease, was quite unimpaired, he wondered whether *senile tuberculosis* was altogether excluded. He also was reminded of certain odd cases which Mr. Shattock and he had seen together, in which, clinically, there could apparently be no doubt as to the malignancy of the condition, whilst microscopically the affection was found to be an obscure infective inflammation, which even Mr. Shattock did not know how to describe exactly. Thus this case, too, after all might not be malignant. All the same, he agreed with Sir StClair Thomson's operative proposals.

Dr. DUNDAS GRANT advised Sir StClair Thomson not to remove a large portion of it by means of Jurasz's forceps. He once did so in a similar case which he believed to be malignant, and he pulled away nearly the whole of the vocal cord, and it proved to be non-malignant. The patient's anxiety was removed, but the voice was not recovered. He did not regard the present case as certainly malignant. Mobility of the cord did not exclude a diagnosis of malignancy, but mobility would be most unusual with a growth of this extent if malignant. He would be much interested in the result of the microscopical examination of a small fragment.

Dr. DAN MCKENZIE asked if the exhibitor had thought it an unsuitable case for the removal of a portion for microscopical examination. In supposed laryngeal cancer, the absence of any support of the diagnosis from the microscope would lead the speaker to hesitate to perform thyrotomy.

Dr. JOHNSON HORNE agreed that the case was not very obviously a case

of epithelioma of the vocal cord; the cord was so remarkably free in movement in spite of the extent of the ulceration. He had seen similar cases which subsequently were proved to be senile tuberculosis of the larynx.

Dr. FITZGERALD POWELL entirely agreed with Sir StClair Thomson as to the nature of the cases and as to the procedure he proposed to adopt. He could not agree to the suggestion of punching out a portion of the diseased cord for diagnosis. If the disease was tubercular it was better away, and if malignant, as he thought it was, it would only hasten the spread of the growth from the cord to the deeper structures.

Sir STCLAIR THOMSON replied that the patient's blood-pressure was 200 and his age sixty-nine, so that it was not such a very simple case to operate on. He showed the case because in some instances one had to wait for some indication of malignancy. This was a case in which the "penny-in-the-slot" method of diagnosis did not work; it depended entirely on a trained eye. He did not regard it as an absolutely clear case, but he brought it to show how one must sometimes act on a probability. With regard to tubercle, the patient had been overhauled by a physician. With regard to removing a portion for examination, this was not a growth "on" the cord. Sir Felix Semon would agree that there were cases in which the cord was infiltrated and there was no differentiation between the cord and the growth. If a portion were removed and reported to be non-malignant, he would still not like to leave that patient alone. If it were his own larynx, he would not have it touched for removal of a piece, because of the danger of rapid spread afterwards. Senile tuberculosis of the larynx was very difficult to diagnose, and it would often occur in the absence of pulmonary or other symptoms. One thing he did as a routine, which was helpful when doing laryngo-fissure: When the larynx was split, instead of having a pathologist to examine the growth on the spot, he felt it with the finger; there was a peculiar cartilaginous feel which he regarded as almost pathognomonic.

Pulsating Elongated Swelling on Lateral Wall of Pharynx.—
W. Stuart-Low.—*Case 1.*—A boy, aged seven, who has a pulsating elongated swelling on the lateral wall of the pharynx on the left side just behind the tonsil. He was sent to the hospital for removal of tonsils, no complaint being made of any inconvenience in the throat. The interesting points with reference to this case are: The youth of the patient, the danger of injury to the vessel in operating on the tonsils, and whether it is likely to develop into the same troublesome, and sometimes painful, condition—that of the second case.

Case 2.—A man, aged sixty, with a similar pulsating swelling also on the left side of the pharynx; the pulsation can be felt up the side of the neck towards the ear. He complains of a throbbing in the neck, and sometimes of pain, and that the beating keeps him awake at night. This is most likely an aberrant branch of the carotid or the ascending pharyngeal artery; pulsations can be both seen and felt in the pharynx and neck. If the boy shows an early stage of what the man illustrates, can anything be suggested to prevent him developing what is an incapacitating condition?

Dr. PETERS thought Mr. Stuart-Low might safely perform tonsillectomy, and might use the new guillotine exhibited that afternoon. The second case he regarded as one of arteriosclerosis; that the symptoms were due to degenerated arteries, rather than to one particularly enlarged vessel.

Mr. HERBERT TILLEY said he had had a case identical with the first

of these, and because of the marked degree of pulsation he postponed operation on a large septic tonsil, but in six months the symptoms increased so much that the operation was decided on, and all preparations were made for severe hæmorrhage, but he did not think he had ever seen a case in which tonsillectomy was accompanied by less hæmorrhage.

Dr. GRANT said that perhaps if this condition were more frequently sought for it would be oftener found. He did not think there was any reason for anxiety that it would develop into a troublesome painful condition. With regard to the request for suggestions to prevent the case developing into an incapacitating condition, there were some enlarged and infiltrating glands which seemed to push the vessel a little farther into the pharynx than would be the case in their absence. In the second case he thought there was a slight drooping of the left eyelid, suggesting interference with the sympathetic, producing weakness of the non-striated muscle in the orbit.

Dr. D. R. PATERSON said that in the second case there was deafness and tinnitus aurium present which added to the discomfort, and thought the pharyngeal condition might have but little to do with his symptoms. He had certainly seen just as prominent vessels with no complaint whatever on the part of the patient.

Sir FELIX SEMON said that a perusal of the *Transactions* of the old Laryngological Society would show the records of several such cases of pulsating vessels on the posterior wall of the pharynx.

Mr. STUART-LOW replied that the discovery was due to his assistant, Dr. MacKeith, who saw the condition when about to operate. The man was incapacitated, as this kept him from sleeping, and was costing the State money every week.

Hæmostatic Guillotine.—G. J. F. Elphick.—The instrument was designed for the complete enucleation of tonsils, which are removed from their beds, with their capsules, without loss of blood. The method used is approximately that of Sluder, but, in addition to the one cutting blade, there is a crushing blade, which enters between the anterior faucial pillar and the tonsil, and effectively crushes all vessels between the capsule of the tonsil and its bed. When the crushing blade has been pushed home, it remains locked in this position by the Hagedorn catch at the base of the handle of the instrument. A light pair of fixation forceps is now applied to the protruding tonsil (*i.e.*, on the uvula side of the blade), and the cutting blade, which enters between the crushing blade and the tonsil, pushed home. The tonsil is now lifted out on the fixation forceps. The crushing blade, being still applied to the vessels which have been cut through, may be left on for a few moments, and then gradually released by pressing down the catch with the little finger.

The method is a simple one; there is no bruising of the faucial pillars or surrounding tissues, no muscle-tissue is removed, and in vigorous adults, where the risk of hæmorrhage may be great, it offers the safest possible way of preventing bleeding, in that all vessels that have been cut through can be held just as long as the operator pleases, and when released the proximal ends have been thoroughly crushed by the serrated edge of the crushing blade. The blades of the instrument are made in three sizes, and the one chosen should be of such a size that the tonsil can be most comfortably pushed through the ring. The fixation forceps are only necessary to prevent the tonsil from falling down when isolated.

The PRESIDENT, referring to the statement on the agenda paper that Sluder's method was used, said that the technique carried out in this

country was really that of Whillis (of Newcastle). It was a development of an older method, which was illustrated in Sir StClair Thomson's book, in which enucleation was performed with the shaft of the guillotine lying across the buccal cavity. That Dr. Elphick's hæmostatic guillotine was an excellent enucleating instrument he could testify from personal experience.

Dr. DUNDAS GRANT asked how the cutting blade was to be driven, seeing that both hands were supposed to be already occupied.

Dr. ELPHICK replied that after pushing the tonsil through the ring with the left index finger the crushing blade was pushed home with the right hand and automatically held in position by a Hagedorn catch, and both hands could be then released, if necessary, for pushing home the cutting blade.

Deficient Tension of Vocal Cords.—H. Lambert Lack.—The patient, a man, aged twenty-five, has suffered from weakness of the voice three years or more. He cannot tell when it commenced, but says he had a good voice when he was eighteen. There was no definite history of onset or cause. He has had a good deal of treatment without effect. On phonation there is an elliptical opening between the cords. The cords themselves are somewhat congested. There does not appear to be much functional element in the case. Suggestions as to the pathology of the condition and treatment would be welcomed.

Mr. HERBERT TILLEY said he thought it was a case of weakness of the internal tensors. He had never seen treatment do good in chronic cases, and he did not think this patient would get any better.

Dr. DUNDAS GRANT said it was interesting that this man practised the alto voice and sang in that voice in a choir. This meant some unnatural action of the muscles of the larynx; at any rate it put a great strain on the fibres of the internal thyro-arytenoid muscles required for thinning of the cords and damping of certain portions of the cord. He saw this condition often, in minor degrees, as the result of laryngitis.

Extensive Papilloma of the Trachea.—H. Lambert Lack.—This patient was first seen in 1906. She had consulted various physicians and specialists, complaining of difficulty in breathing, which by some was considered to be asthma. A correct diagnosis had never been made until one day the patient expectorated a small piece of papilloma. When I first saw the patient she had considerable dyspnoea and pink granulations could just be seen in the lowest part of the trachea. The bronchoscope was not then in use. As the patient's condition was desperate I decided to give her chloroform, open the trachea as widely as possible and get the growths out quickly. This was done. The patient became more and more cyanosed as the operation proceeded, but directly I pushed my finger down the trachea, breaking down large masses of papillomatous growths, which completely obstructed the tube, the patient was able to cough up blood and growth and at once breathed more freely. A large amount of growth was then removed by forceps and curetting. The masses seemed to grow from all round the trachea for a distance of an inch and a half and more, extending nearly to the bifurcation. The patient made a good recovery, but the trachea was kept open for a subsequent examination. Two or three weeks later some small growths were removed under cocaine and then the tracheal opening was allowed to close. The patient has remained perfectly well ever since. Lately, some

small papillomatous growths have appeared on the skin of the neck. The case, as far as I know, is unique.

Dr. GRANT said he had described a similar case.¹

Epithelioma of Right Tonsil.—Hunter Tod.—The patient, a man, aged forty-two, has noticed, for two or three months, slight pain on swallowing and shooting pains up to the ear on the affected side. On examination the right tonsil is found to be superficially ulcerated. The edge of the ulcer extends into the anterior and posterior pillars of the fauces and on to the base of the tongue. The margin is raised, everted, and indurated. No glands can be felt in the neck. It is a comparatively early case, and suitable for operation with the knife or diathermy treatment.

Mr. HARMER thought it was an early epithelioma and suitable for treatment by diathermy. The important question which was brought up at Aberdeen by Dr. Lack, as to whether diathermy was superior to the knife in the treatment of all accessible growths of mucous membrane of pharynx and mouth, was raised by this case. He (the speaker) thought the results of diathermy were so admirable that it was preferable to a cutting operation in such a case. After diathermy the patient would be able to leave his bed on the second, or at worst the third day, and that could not be said after an even trifling operation with the knife.

The PRESIDENT thought the pronouncement made independently by Dr. Lack, Mr. Harmer and himself, was a very important one—viz., that it was permissible, in the first instance, to try a non-cutting operation such as diathermy in throat cancer; with it there was less bleeding and less risk of implantation and dissemination, as the lymphatics were sealed. The results of surgical diathermy were very extraordinary, especially in a condition like advanced throat cancer, which it robbed of many of its terrors in the direction of obstruction of the upper respiratory and food passages.

Mr. Tod replied that he favoured diathermy.

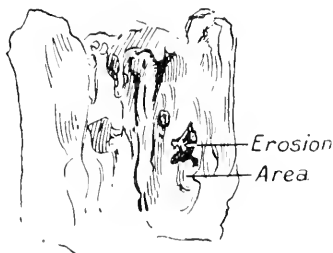
Carcinoma of Palate.—Hunter Tod.—This case had been treated for lupus for over a year without success. A portion of the tissue was then examined by microscope and found to be carcinomatous. Treatment by diathermy, two sittings: (1) August, 1914, and (2) early in October. Growth now eradicated, except over small area on left side. Further diathermy treatment was proposed.

Ulceration of Soft Palate and Tonsil.—Walter Howarth.—Patient, a male, aged twelve. The condition has lasted three months, and is said to have been progressive during that time, but is stationary at present. Section shows general hyperplasia, but no evidence of tuberculosis.

Rhinogenic Meningitis.—P. Watson-Williams.—A. S.—, admitted on September 22, 1914, had been complaining of discharge from the nose and headaches for some months. The left and right antra were explored, and the left contained pus. Right antrum opened some months previously. September 30, 1914: The left maxillary antrum opened intranasally. Frontal sinus not operated on. October 1: Restless, complaining of pain behind nose.

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., 1901 xix, p. 649

Two days later developed symptoms of meningitis. F. O.: Right blurred and left same; optic neuritis. October 4: Died with symptoms of general meningitis. *Post-mortem* examination: Acute purulent meningitis originating from an area of erosion in the middle ethmoidal cells roof—*i. e.* opposite side to operation.¹ N.B.—(1) There was a normal left frontal sinus, but no right frontal sinus could be found; (2) if a right pre-nasal frontal sinus operation had been attempted (as had been the case some months previously by another operator) it must have failed and the rapidly following death with the *post-mortem* finding would have



Sketch showing the crista galli (in median line) and, on either side of it, the cribriform plate and other parts of anterior fossa forming roof of nasal passages. On the right side the erosion area is indicated.

suggested the operation as the cause of meningitis; (3) if the right antrum had been operated on at the same time as the left, instead of months previously, it would also have caused suspicion of traumatism or thrombo-phlebitis due to operation as the cause of death. This case has therefore a medico-legal interest.

Abstracts.

PHARYNX.

Rolleston, J. D., and Macleod, C.—Intramuscular Injections of Antitoxin in the Treatment of Diphtheria. "British Journal of Children's Diseases," vol. xi, No. 289.

The authors conclude that intramuscular injection, preferably in the vastus externus, deserves to supersede all other methods of administration of antitoxin in the treatment of diphtheria for the following reasons: (1) It is quite as simple as the subcutaneous method, ensures much more rapid absorption, is less painful, and less liable to give rise to abscesses at the infection site. (2) It is superior to the intravenous method, not only in the greater simplicity of its technique, but also in the less rapid excretion of antitoxin after injection. (3) The more rapid absorption of antitoxin by the intramuscular route is shown, not by the effect on the faucial or laryngeal process, but by the lesser incidence of paralysis, especially of a severe kind.

Macleod Yearsley.

¹ For a similar case see JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxvii, p. 538.

Johnson, H. R.—Case of Cavernous Sinus Thrombosis of Otitic Origin with Recovery. "Laryngoscope," February, 1913.

The author is of the opinion that this is only the second case of recovery recorded from cavernous sinus thrombosis, the other one being a case of Adair-Dighton's ("Annals of Otology," June, 1912).

A male, aged fifty-nine, was operated on for acute mastoiditis following acute otitis media. Eight days later rigors commenced and continued for five days, when the case was seen by the author. The patient then was in a condition of acute sepsis with effusion into the right knee-joint. The mastoid wound was unhealthy, and there was chemosis and congestion of the left eye with drooping of the lid. Next day there was marked left proptosis and chemosis with intense bilateral papillitis. The lateral sinus was exposed and found to be thrombosed. Clot was cleared out back to the torcular and the jugular ligatured in the neck. Only one rigor took place after operation and recovery slowly took place, the proptosis and orbital swelling subsiding, but with complete loss of vision from post-neuritic atrophy.

A. J. Wright.

NOSE.

Tirumurti, T. S.—Rhinosporidium Kinealyi. "The Practitioner," vol. xciii, p. 704.

Rhinosporidium Kinealyi is a sporozoon parasite. Its study leads to certain conclusions, the first of which is that the name given to it by O'Kinealy is a misnomer, since it occurs in other situations, although it prefers the nasal mucosa. Infection is probably conveyed by clothing, handkerchiefs, or hands. The spores are discharged in the nasal secretion, which is profuse. As the growth of the parasite is one of long duration, the source of infection is forgotten and the history difficult to elicit. The preponderance of the parasitic cysts in large numbers, mainly in the epithelial and sub-epithelial tissues, is suggestive of the mode of conveyance by infected nasal secretion. The parasite may be conveyed by sexual congress, as it has been found in the penis. It is likely that rhinosporidial polypi may occur in the mouth, anus, and vagina. The recurrence and innumerable number of cysts in different stages of development show that the sporozoon undergoes its complete cycle of developments in the human body, without the intervention of an intermediary host. Most cases come from Malabar, but a few have been found in Peramber, Trichinopoly, Tinnevely and Dindigul. A single instance has been recorded in America.

Macleod Yearsley.

EAR.

Plummer, Edward M., and Mosher, P. Harris (Boston, U.S.A.).—A Report of the Results of Seven cases Operated upon by Mr. Heath. "Annals of Otology," etc., March, 1914.

A week before the Ninth International Otological Congress in Boston in 1912, Mr. Charles Heath, of London, was given the freedom of the Aural Department of the Massachusetts Charitable Eye and Ear Infirmary. He selected seven cases upon which he operated with his own instruments and with the help of his own assistant, and carried out the after-treatment himself for two weeks. After his departure the cases were dressed by the writers of this article and occasionally by the senior house officer. At first Mr. Heath's method of after-treatment was

followed rigidly, but when certain cases failed to respond the usual after-treatment of the hospital was substituted. Seven months after the operations all the patients were asked to report, but only four responded.

The present report is issued without obtaining the formal consent of Mr. Heath, who had, however, stated that he wished a candid and impartial consideration of his work.

The first case was one of recurrent acute suppurative otitis media with mastoiditis. The case was not dry at the end of two months. The second case was apparently also acute, but at the operation Mr. Heath thought that cholesteatoma was present. The second case was dry in four months.

Plummer and Mosher, in their summary of the results, state that there were two cases of otitis media suppurativa with mastoiditis; two cases of otitis media suppurativa acuta with mastoiditis and post-aural abscess (one of these cases was recurrent); three cases of otitis media suppurativa chronica. Two of the seven cases required re-operation. Of the acute cases two are known to be dry and to have the antrum filled in and epidermatised, and to have healed tympanic membranes. The shortest time in which the middle ear became dry was seven weeks and the next three months. The third case had the antrum dry and epidermatised in two months and a half but the middle ear was still moist.

Two of the three chronic cases are still discharging after seven months.

Of the two re-operated cases, the first was two thirds healed at the time of writing and the second was cured.

The results as regards hearing in the seven cases are as follows: In the first of the acute cases there has been no impairment. In the second the hearing was not impaired when the patient was discharged from hospital. In the third the writers presume that little, if any, impairment of hearing has followed the operation. In the fourth and last of the acute cases the radical operation was necessary and a severe loss of hearing has resulted.

As regards the hearing result in the three chronic cases: One shows a slight loss since operation and one a considerable loss. In the third case the patient was practically deaf in the diseased ear and probably shows but little loss: this case did not report.

The writers acknowledge that as Mr. Heath did not carry out the whole of the after-treatment himself, the results are sure to be less favourable than they would have been had he done so. The writers remark that if Mr. Heath's operation is to be done by any one except himself, the after-treatment must not be so difficult that men of average ability cannot carry it out.

As regards the cosmetic result, Plummer and Mosher acknowledge that the scar left by Mr. Heath's operation is the best looking scar known to them, but they state that the tip of the mastoid and the lateral sinus are not easily dealt with through Mr. Heath's incision. When questioned about this, Mr. Heath replied that he was always ready to make a supplementary horizontal incision if necessary. He did not find it necessary, however, to do this in any of the seven cases, in spite of the fact that in one of them he missed the antrum and unknowingly, and fortunately, missed a forward lying sinus.

The writers state that after operation everything at first looks very nice, but a bit later, when, in spite of all care, granulations begin to spring from the bridge, the picture changes to a less pleasing one. These granu-

lations soon obscure a large part of the drum-head and dam back the discharge. In some cases the superior wall of the canal sags and the flap made from the posterior wall breaks from its moorings and projects forwards into the lumen of the canal, obscuring the view and hampering the dressings.

Plummer and Mosher admit that three of the four acute cases did well, but hold that in none of the three was the time necessary to accomplish a good result as short as is often the case when the usual operation for acute mastoiditis is performed.

None of the chronic cases did as well as they would have done had the radical mastoid operation been performed. The serious defect of the Heath operation is that it attempts to deal with the mastoid process from an awkward angle and through a restricted space, namely, the posterior canal wall. "The vital defect of the operation is insufficient exposure of the mastoid surface and incomplete removal of pathological conditions within it."

The writers state that they are under great obligation to Mr. Heath for reviving the question of operating early, both in acute and chronic cases, in order to preserve as much of the hearing as possible. They praise Mr. Heath's mechanical dexterity and his generous personality and they consider that he has made the otological world stand and reconsider.

J. S. Fraser.

MISCELLANEOUS.

Whale, Harold H.—**Salvarsan in the Treatment of Syphilis of the Upper Air-passages and Ears: Illustrated by thirty-seven cases.** "St. Bartholomew's Hospital Reports," vol. I, p. 1.

This excellent and useful paper offers the following conclusions: (1) Salvarsan and allied drugs offer an encouraging prospect of cure in syphilis of the upper air-passages, especially of the nasal walls. (2) The prognosis as to cure is affected by the duration of the infection rather than of the lesions. (3) 606 is rather more effective than 914. (4) Between injections mercury, without iodides, should be given. (5) The Wassermann test disagrees with the clinical findings in a proportion of cases which is insufficient to discount the value of this test. (6) In syphilitic affections of the labyrinth, the prospect of improvement is greater for the vestibular than for the cochlear apparatus.

Macleod Yearsley.

Stetten (New York) and Rosenbloom (Pittsburgh).—**Clinical and Metabolic Studies of a Case of Hypo-pituitarism due to a Cyst of the Hypophysis with Infantilism of the Lorain Type.** "Amer. Journ. Med. Sci.," November, 1913.

Previous studies of metabolism in perversions of the pituitary gland have been concerned for the most part with hyperpituitarism (acromegaly). The case here reported, however, of which the writers made a detailed study, was a typical example of the opposite condition—hypopituitarism. The condition was due to a cyst of the hypophysis affecting a male, aged twenty-two, and giving rise to blindness, headache, and infantilism. The cyst was exposed and its lower wall removed by Kanavel's infra-nasal sublabial transphenoidal route, and the operation was followed by complete disappearance of the headache and marked improvement in the patient's

general condition. The loss of vision, which was complete in one eye and very marked in the other, remained uninfluenced by the operation.

A careful study of the patient's metabolic processes showed a marked perversion leading to high and abnormal percentages of neutral sulphur and undetermined nitrogen in the urine.

Thomas Guthrie.

Fraser, Francis R. (New York).—Epidemic Poliomyelitis. "The Journal of the American Medical Association," January 18, 1913.

The virus of poliomyelitis is present on the mucous membrane of the nose and throat, not alone of persons ill of the disease, but also, according to Fraser, of healthy individuals who have been exposed to the contagion. In support of his contention the author cites the following case: The parents of a child, who had a typical attack of epidemic poliomyelitis, were subjected to a naso-pharyngeal irrigation with normal saline solution. This fluid was injected into a monkey, and in the course of twelve days paresis of both legs appeared. Sections of the spinal cord and medulla showed the typical lesions of experimental poliomyelitis. An emulsion of the spinal cord of this monkey was injected into a second monkey, which caused a similar paralysis, with similar *post-mortem* findings.

From the above the author concludes that the virus of the disease is present in the naso-pharynx of healthy persons who have been in close contact with an acute case of poliomyelitis, and that these people are passive carriers of the infection.

Birkett (Rogers).

REVIEWS.

Die Syphilis der Unschuldigen (Syphilis Insontium). Lecture by Prof. P. H. GERBER (Königsberg). Published by Curt Kabitzsch, Würzburg, 1914.

This is a lecture delivered to a more or less popular audience in the East Prussian Branch of the Society for the Campaign against Sexual Diseases. The writer fully justifies the task of delivering this lecture being entrusted to him as a specialist in diseases of the nose and throat, because, as he says, almost a half of all cases of syphilis insontium arise from infection in the mouth and throat. To show the frequency of its occurrence and the necessity for its frank recognition he quotes largely from Bulkley's well-known American monograph on the subject. Though the points brought forward are familiar to our readers they cannot be too often insisted upon in despite of the unhealthy prudery which is apt to keep them in the background, and this lecture is a very good model on which such instructions may be moulded.

Dundas Grant.

Le Traitement des Sténoses Aigues du Larynx (Treatment of Acute Stenosis of the Larynx). By Dr. GUILLERMO ZORRAQUIN (Buenos Ayres). Paris: Vigot Frères, 1914. Pp. 45. Price 2 francs.

In this interesting and original brochure, Dr. Guillermo Zorraquin compares and criticises the methods of intubation and tracheotomy in cases of acute stenosis of the larynx, more especially those arising from such infective conditions as diphtheria. He indicates that intubation is not quite such a simple and smooth-going proceeding as is apt to be supposed, the chief objections to it being the difficulty in swallowing

liquids which follows it, the narrowness of the tube through which air is admitted, and the tendency to the formation of decubital ulcers. "Deglutition-pneumonia" is, of course, the main danger. In regard to tracheotomy the traumatism of the trachea is the special additional factor; the air, however, enters through a wide channel, but has not the advantage of being warmed and moistened as it has in the case of intubation. In a very interesting pneumographical study he makes a comparison between ordinary tracheotomy and tracheotomy with a fenestrated cannula and valve allowing of inspiration only through the outer orifice of the tube, expiration continuing through the larynx. In the former case breathing is much more rapid and the needful repose is abrogated. This is much less marked when the valve and fenestrated cannula is used. It was found also that with the ordinary cannula, asphyxia from want of oxygen was much more rapid, but, on the other hand, asphyxia from carbonic acid much less so, showing that with the modified cannula the absorption of the gases inspired was greatly heightened. Moreover, the capacity for coughing was preserved, the restoration of voice could be noted, and the dilatation of the larynx greatly favoured by the blast of expired air passing through it. The author describes his valve cannula, and there seems little doubt that his experiments with it in the case of dogs are extremely convincing. He has, however, only once tried it on the human subject, and it remains to be seen whether the cannula he recommends is likely to be found free from inconvenience when the discharge and other difficulties incident to acute laryngeal stenosis in children are present. The principles enunciated are of the utmost theoretical value, and their application to actual practice is well worthy of consideration.

Dundas Grant.

NOTES AND QUERIES.

KING GEORGE'S HOSPITAL.

A large hospital for sick and wounded soldiers, consisting of no fewer than 1650 beds, has been opened in London under the auspices of the Red Cross Society and the St. John's Ambulance Association.

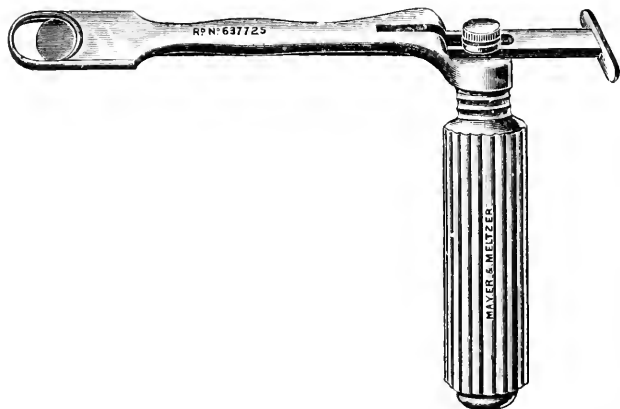
According to intimations which have appeared in the public press the following gentlemen have been appointed to the Department for Diseases of the Throat, Nose, and Ear:—Sir StClair Thomson, Dr. Dundas Grant, Mr. Herbert Tilley, and Mr. Arthur H. Cheatle.

NEW INSTRUMENTS.

To the Editor of THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

SIR,—In the current issue of the JOURNAL under the head of "New Instruments," there is an illustration of a tonsil guillotine, which, from the description appended, might lead to the belief that it was of original design. Herewith I enclose an electro of the guillotine I designed a year or two ago in consequence of a conversation I had with Dr. Irwin Moore. It is my old guillotine (of which thousands have been made)

turned upside down to suit the modern fashion of removing the tonsil. Messrs. Mayer and Meltzer have sold many of them, and have a bundle in their shop for sale. The electro I enclose is a copy of the block which they have had for a considerable time. There is a difference, however, in the two instruments (mine and the one you illustrate), for in the latter, half the sheath and blade are cut away near the handle, where the greatest strain comes; in other words, the instrument is weakest where it



should be strongest; this, I need scarcely point out, is *bad engineering*. With this exception, the instrument is like mine.

Yours obediently,

LONDON, W.,

CHARLES J. HEATH, F.R.C.S.ENG.

February 10th, 1915.

[We have submitted a proof of Mr. Heath's letter to Dr. Sanderson, and he has replied as follows.]

To the Editor of THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

SIR,—About sixteen months ago I spoke to Mayer & Meltzer's representative with reference to having a guillotine made similar in measurements and appearance to the short Mackenzie instrument that I had been accustomed to use, but with a reinforced shaft and the blade on the inner side. The device, present in Mr. Heath's and Mr. Stuart-Low's instruments, of placing the fixing screw on top of the handle was used, but I was quite unaware until the latter part of last year that Mr. Heath had had his own instrument altered to suit the times.

I had the opportunity of seeing this instrument for the first time only a few days ago. Mr. Heath states that there is only one difference between the two instruments, viz., that in mine half the sheath and blade are cut away near the handle. Mr. Heath may cut as much of his instrument away as he chooses; he will never get the two to correspond. The engineering is so far successful that I have removed over 1200 tonsils without any visible sign of strain in the instrument.

Yours faithfully,

W. SANDERSON.

54, RODNEY STREET,
LIVERPOOL;

February 22 1915

THE
JOURNAL OF LARYNGOLOGY,
RHINOLOGY AND OTOTOLOGY.

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ASPERGILLOSIS OF THE NASAL ACCESSORY SINUSES.

BY HERBERT TILLEY, F.R.C.S., M.D.,

Surgeon, Ear and Throat Department, University College Hospital, London,
and to the King George Hospital.

It will be within the recollection of many members of the Laryngological Section of the Royal Society of Medicine that at a recent meeting I reported some details of five cases of aspergillosis of the maxillary antrum, and Prof. S. G. Shattock demonstrated the histological features of the material derived from some of them.

With the exception of Mr. W. D. Harmer, I believe no member of the Section was able to recall having ever seen or recognised the affection, and for this reason it may be well to describe in some detail the symptoms and clinical appearances which were present in my patients.

The condition must be very rare, because, apart from Mr. Harmer's case (JOURN. OF LARYNGOL., RHINOL., AND OROL., 1913, xxviii, p. 494), I can find no mention of it in the literature of rhinology, and this in spite of the many thousands of antra which have been opened for suppurative and other pathological conditions.

On the other hand, it is not improbable that the true nature of many cases has been overlooked, and may be, now that attention has been called to the disease, we shall find instances of this

mycotic infection cropping up with greater frequency. For example, in the current number of this JOURNAL (February, 1915, p. 83), Mr. W. S. Syme reports a case of "Myxomatous Disease of the Maxillary Antrum," and when I read that "*both* antral cavities were found to be filled with a *pearly, exceedingly sticky* [the italics are mine] elastic material," my suspicions are aroused as to whether it was not really a case of aspergillosis, for those features mentioned by Mr. Syme are very characteristic of the fungus infection. He further says: "The pathologist reported that the material was very difficult to examine, but was probably myxoma."

Now, Mr. Shattock spent many weeks in patient research before he unravelled the mystery of the specimens I gave to him from my cases, and he actually described my first specimen (*Lancet*, 1909, ii, p. 136) as "Case of Endothelioma Myxomatodes of the Maxillary Antrum."

It will also be noted that in Mr. Syme's patient *both* antra were filled with the same material. Is it probable that each antrum would contain a myxomatous new growth? I should think it very unlikely, but I *do* know that one of my patients had both antra and the ethmoidal sinuses filled with material such as he describes, and that Mr. Shattock proved it to contain the mycelium of aspergillus.

Ætiology.—That the pathological conditions which will be described are associated with the growth of the aspergillus mycelium has been definitely proved. But we do not know the mode of infection, nor whether the conditions such as we see there, are caused by the growth of the mycelium alone, or whether this is grafted on to a chronic inflammatory affection of the antral mucous membrane.

Furthermore, each of my five patients were adult females; Mr. Harmer's was a female; and, again, Mr. Syme's case of "Myxomatous Disease of the Maxillary Antrum" (*loc. cit.*) was a woman, aged twenty-eight.

Two of my five cases were referred to me by my friend, Dr. Edward Law, but neither of us suspected their nature until the antra were explored at the time of operation.

Symptoms.—Marked nasal obstruction has been a prominent feature in each of my patients, and this has been associated with sneezing, discharge of a mucoid or slightly muco-purulent fluid, the occasional expulsion of small masses of a whitish-grey, semi-translucent, viscous material, and neuralgic pains in the cheek and

face. In no instance was the discharge so free, or so situated in the nose as to suggest an ordinary chronic empyema.

In a letter written by my first patient after she had been cured, she says: "For several years I had had bad headaches sometimes, but always when tired, and these were more severe towards evening, and lately most severe at night, when they would awake me. My so-called headache affected the whole left side of my face. I had toothache, earache, and *severe* pain in my left eye."

Examination.—The most striking intranasal feature of my cases was the pale, swollen, and œdematous condition of the nasal mucous membrane, which was not overcome by the application of 20 per cent. solution of cocaine.

I cannot recall any other intranasal disease in which the want of response to the contracting power of cocaine has been so well demonstrated. As a result of this, it was necessary to use a long-bladed speculum in order to examine the deeper regions of the nasal cavities.

By this means it was ascertained in one of my patients, in whom both antra were affected, that the ethmoidal regions were in a condition of polypoid degeneration, the bony walls of the cells were very friable, and the sinuses were filled by the same sticky, semi-solid material which was found in the antra (*vide infra*).

The removal of polypi was followed by very little bleeding, less, indeed, than one is accustomed to meet with when operating on uncomplicated nasal polypi.

In two patients, the inner antral wall above the attachment of the inferior turbinal was bulged inwards, and when examined by a probe it gave the impression of a tense cyst.

Transillumination revealed opacity in both infra-orbital regions.

Exploration.—Lichtwitz's trocar and cannula were used and the puncture made through the outer wall of the inferior meatus.

It was impossible to get any return of the fluid used for irrigation, a circumstance which suggested that the end of the cannula was in a cyst or new growth.

Diagnosis.—The high degree of nasal obstruction caused by swelling and œdema of the mucous membrane, the inability to produce the usual retraction of this by strong solutions of cocaine, the attacks of sneezing, followed by the expulsion of small pieces of the greyish-brown, semi-translucent material, intense pain of a neuralgic nature radiating from the cheek to surrounding regions, the opacity of the antrum, and the inability to irrigate it by an

exploring needle—all these symptoms should in future suggest the nature of the disease.

The diagnosis would be placed beyond doubt if the mycelium was discovered in any of the expelled portions of the gelatinous material, but if these are not to be obtained the true nature of the disease may only be revealed when the antrum is opened through the canine fossa.

Anyone who has once seen the contents of the sinns under such circumstances could not mistake them for any other pathological lesion with which I am acquainted.

Treatment.—All of my cases were operated on by the Caldwell-Luc method, and recovered without any incident of particular interest. So far as I know the disease has not recurred in any of them.

On removal of the anterior antral wall, one is at once struck by the bluish-grey, glistening surface of the antral contents, which rather resembles the appearance of a cholesteatoma of the mastoid antrum. The material is easily separated from the walls of the sinns, and bears a close resemblance to the soft contents of a muscatel raisin; it is so viscous and sticky that it is easier to scrub, than to wipe it from a curette or spoon.

There is much less bleeding than occurs when the radical operation is performed for empyema of the antrum.

So far as my present experience goes I have not known the frontal sinns to be affected, but I suspect that the sphenoidal air-cells were involved in the patient whose anterior and posterior ethmoidal cells were extensively involved.

In future cases which may come before the rhinologist, it will be interesting if we can determine how far the disease is *sui generis*, or to what extent the aspergillus merely complicates a pre-existing pathological condition of the sinuses.

Appended is the histological report of the first, and of a later specimen, which I handed over to the safe keeping and searching intelligence of Prof. S. G. Shattock, Curator, Royal College of Surgeons. I know better than anyone else the hours of patient labour which he spent in wresting the secret from the weird material with which I was able to supply him. Hence, in concluding these brief notes, I would like to thank him, in the name of our specialty, for throwing a flood of light on one of the most recent problems in the pathology of a rare affection of the nasal accessory sinuses.

HISTOLOGICAL REPORT UPON THE MATERIAL REMOVED FROM THE ANTRUM
BY MR. HERBERT TILLEY, FEBRUARY, 1914; BY PROF. S. G.
SHATTOCK.

The material consisted of a flattened, irregularly oval mass, 2 cm. in longer diameter and 7 mm. in thickness, of firm consistence, homogeneous, and somewhat translucent. The most successful microscopic sections of it, were those made (after formol hardening) by means of the freezing microtome, on which it cut like firm cheese; its peculiar consistence rendered it particularly intractable in paraffin. The sections were stained by the various methods likely to throw light on its structure; they were all made so as to include the whole of the transverse area of the mass. They show two elements, viz., a mucinous basis, and cells variously disposed in it, without fibre or vessels. In some situations extensive areas of the homogeneous matrix occur in which spheroidal cells are thickly scattered; in others the cells are massed in groups of varying size, the mucin around which forms trabeculae wherein cells are sparsely distributed, or in which they are arranged in narrow lines which pass by gradations into the more voluminous groups. Cell necrosis has occurred in many situations, chiefly in connection with the elements distributed in the substance of the mucin, as distinguished from those which compose the groups.

A study of the cells first mentioned shows that they are spherical in form, and mostly present the subdivided nuclei of polymorphonuclear leucocytes. In regard to the loculated areas the cells in these are, as already noticed, arranged in well-defined groups, the mucinous matrix forming a stroma, as in a neoplasm of alveolar type, in which the connective tissue has undergone complete mucinoid degeneration. The mucinous substance bounding the groups is in places fibrillated in correspondence with the contour of the latter. The cell nuclei of the groups are of very diverse figure, many being flattened and angular, the whole appearance offering a remarkable simulation of such a tumour as an endothelioma of a salivary gland. A close study, nevertheless, leads to the conclusion that the cells in question are polymorphonuclear leucocytes which have become flattened, elongated, and distorted by pressure, since in hæmatoxylin-eosin preparations the cytoplasm exhibits the fine eosin-staining granules of this class of cell; and, further, in the smaller of such groups polymorphonuclear leucocytes of normal characters are present, and from these the other forms can be traced. In sections, moreover, simply treated with

liquor potassæ, the presence of fine discrete granules is sharply detailed in the cytoplasm of the flattened cells, as it is in the polymorphonuclear leucocytes elsewhere.

The last elements to notice (excluding the micro-organisms) are coarse crystals which occur in the mucin in conspicuous numbers. They vary in size, and in places lie in parallel groups. They are fusiform, although some present an obtuse angle on each side at the middle; they are liable to transverse fracture, and in cross-section are, without exception, regularly hexagonal. They are tinted with the eosin used after hæmatoxylin: coloured blue with

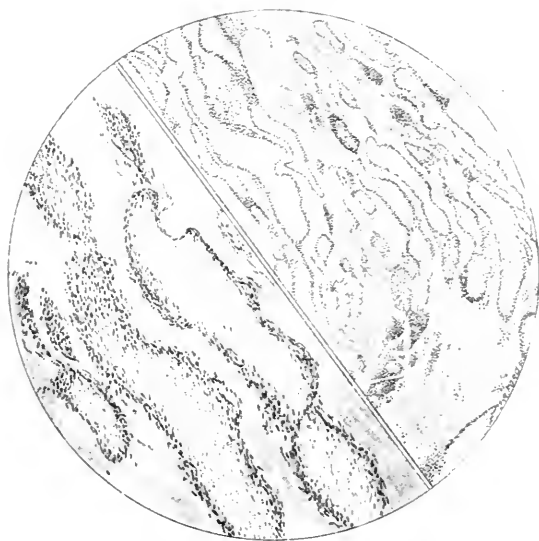


FIG. 1.—Section of the mucinous material from Mr. Tilley's first case, showing the long collections of cells lying in its fissures and simulating an endothelioma with mucinoid degeneration of its stroma. The magnification of the right half is low ($\frac{2}{3}$), that of the left half is higher ($\frac{1}{2}$). The general construction is similar to that described in the present communication.

carbol thionine, and pale reddish-brown with 1 or 2 per cent. aqueous solution of iodine in iodide of potassium, the surrounding mucin becoming yellow. They are not affected by 25 per cent. sulphuric acid, nor by liquor potassæ (British Pharmacopœia). They are not dissolved in sections incubated for twenty-four hours at 37° C. in distilled water, to which a trace of ammonia has been added. It may be noted that these crystals lie at times between cells where there is no intervening mucin.

An examination of unstained sections, mounted in dilute glycerine, with the polariscope shows that the crystals are doubly

refractive; with crossed Nicols they stand out brilliantly on the dark background. These crystals have not yet been identified. When viewed laterally they resemble the Charcot-Leyden crystals found in asthmatic sputum, and those of Schreiner's spermin phosphate obtained from semen¹; they are, however, regularly hexagonal in cross-section, whilst the Charcot crystal is an elongated octahedron.

Whether or not we are dealing with a single substance, crystallising dimorphically, cannot be determined from the data available, the value of which is somewhat reduced, moreover, by the fact that

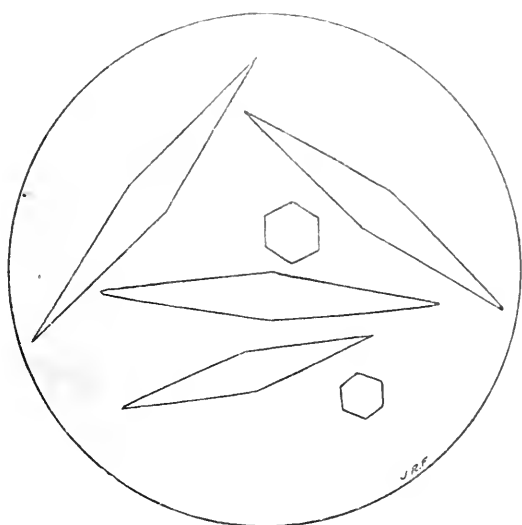


FIG. 2.—Samples of the crystals present in the sections made from the material removed from the antrum. In cross-section they are regularly hexagonal. ($\frac{1}{6}$ obj.)

the crystals in the specimen are not chemically pure (having been formed in an organic fluid), and that the material itself had been fixed in formalin.

In certain areas the mucin is pervaded with a well-developed mycelium, the coarseness of the filaments of which at once excludes any form of actinomyces. When in an intact or healthy condition it constitutes a striking feature; but a close study shows that its extent is much wider than at first appears, for as it dies its position is indicated only by shrunken fragments, or narrow lines of fine granules, or merely by tubular spaces which, though empty, repro-

¹ The identity of Charcot's crystals with spermin phosphate is not certain, although often assumed. (George Barger, "The Simpler Natural Bases," 1914.)

duce the form of the vanished organism. Indications, some or other, of its presence occur in almost every part of the section, except, perhaps, in the circumscribed groups of cells which occupy the cavities or fissures in the mucin. In addition to this mycelium there are, needless to say, collections of bacteria, but these are much less widely distributed than might have been expected.

As regards the identification of the mycelium, it may be differentiated from that of *Blastomyces albicans* (thrush) by its mode of extension, which takes place not by a process of constricted budding, but by the simple lateral extrusion of short processes which are of

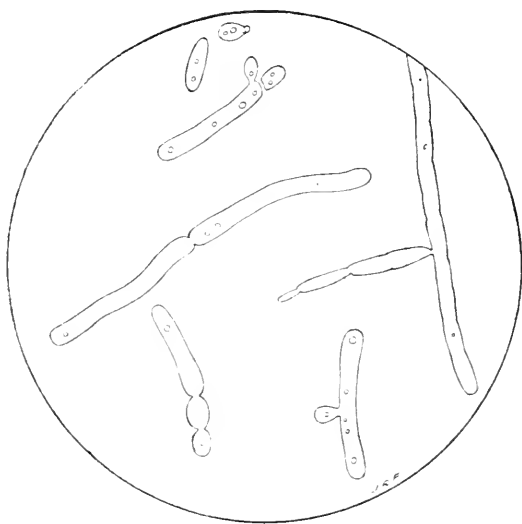


FIG. 3.—*Blastomyces albicans* (thrush); living, in a hanging drop; showing the constriction accompanying the process of budding. (No details of structure are shown in this or in Figs. 4 and 5.) ($\frac{1}{6}$ obj.)

uniform diameter from the outset. In the mycelium of blastomyces the septa, moreover, between the segments (which segments result from repeated formation of a terminal bud), are biconvex and marked externally by a slight recession of contour. The mycelium of aspergillus, on the contrary, presents septa which are rectilinear and rectangular; and its lateral buds, at first hemispherical, afterwards elongate without deviations from the cylindrical form.

There is a third organism which needs referring to—viz., sporothrix. In artificial culture this produces a branching mycelium (coarser than that of actinomyces), the lateral off-shoots of which are of uniform diameter; but, in addition to this, ovoidal yeast-

like "spore-bodies" bud out from the sides of the mycelial threads. That the latter are not simple mycelial extensions appears from the fact that when the mycelium dies in old cultures these other structures persist, and on subculture reproduce the filamentous forms.¹ Mr. A. G. R. Foulerton points out, however, that in the lesions produced by *Sporothrix Schenkii*, whether natural or artificial, mycelium is not developed, but the ovoid cell-forms or "spore-bodies" exclusively. The human lesions produced by Schenk's sporothrix, as hitherto observed, have been refractory subcutaneous abscesses. On the other hand, Pinoy² has described lesions in the

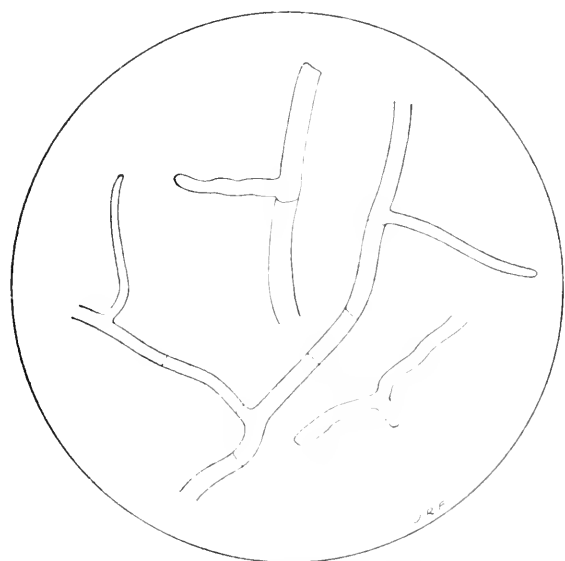


FIG. 4.—Portions of mycelium of *Aspergillus niger*, showing lateral branching, the offsets being cylindrical and of uniform diameter from the first, and the septa of the filaments being rectilinear. In this and the following figure, as the sole object is to show the method of branching, portions of the mycelium have been selected and drawn in an isolated or fragmentary manner. ($\frac{1}{10}$ obj.)

human subject caused by *Sporothrix Beurmanni* (ulcerating granulomata of the skin, pharynx, and larynx), where a mycelium developed in the living tissues, around capillaries which became perforated, and within which the organism produced its "spores." In these different instances, however, "yeast-forms" predominated in the tissues.

Summary.—Closely as some of the microscopic appearances

¹ A. G. R. Foulerton, *Path. Soc. Trans.*, 1901, lii, p. 259; and *Brit. Med. Journ.*, 1912, i, p. 301.

Compt. rend. de l'Acad. des Sciences, Par., 1911, clii, p. 286.

simulate an alveolar type of tumour, of which the stroma has undergone mucinoid degeneration, it seems more correct to regard the formation as a pseudoplasm somewhat akin to the pseudomyxoma of the abdomen which results from the effusion of mucin from a distended appendix, or of the mucinoid contents of an ovarian cyst into the peritoneal cavity. The simulation was so great in the first specimen which Mr. Tilley handed over to me, that I then ventured to suggest the name "endothelioma myxomatodes" for the lesion. A re-examination of the microscopic sections from this case shows the presence of mycelium in the mucinous

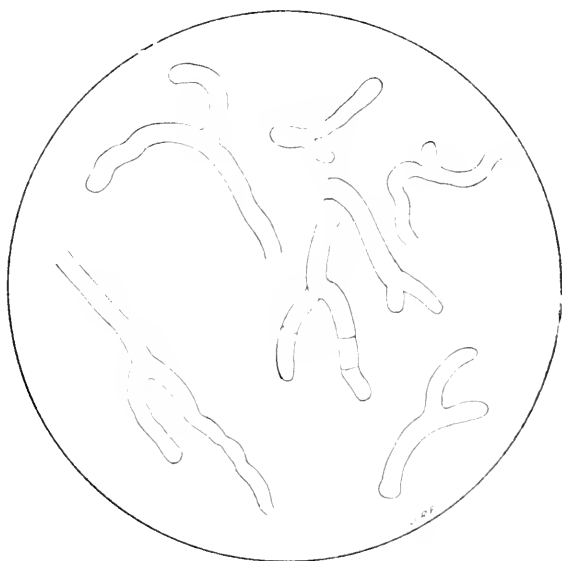


FIG. 5.—Portions of the mycelium in the material from the antrum, showing a mode of branching as in aspergillus. The organism is much coarser than any form of actinomyces. ($\frac{1}{12}$ obj.)

matrix, though it is recognisable in only a few spots. The formation is best viewed as consisting of mucin secreted by the mucosa under irritation and subsequently inspissated, the fissures or less resisting lines of which have been invaded with polymorphonuclear leucocytes, as in the first stage of the organisation of a blood-clot; in this way the collection of cells in elongated groups may be explained. It contains no fibre and no capillaries, although, as its removal was clinically accompanied with slight hæmorrhage, its area of attachment consisted, probably, of vascular granulation tissue. The contained cells are polymorphonuclear leucocytes, the nuclei of which in the circumscribed cell

groups are mostly so flattened as to suggest an endothelial origin; but their finely granular cytoplasm, the granules of which are eosinophile in hæmatoxylin-eosin preparations, indicates that the cells are distorted leucocytes.

In regard to its pathogenesis: the disease may provisionally be attributed to the growth of the mycelium, although the proof of this would, in a future case, rest upon the culture of the micro-organism, and the experimental production of a similar lesion by direct infection of the maxillary sinns in one of the lower animals. On this assumption the disease would be a mycosis of the mucosa-surface. The fact that well-conditioned mycelium occurs in areas of leucocytes apart from the presence of mucin militates, amongst other things, against the supposition that the organism is the source of the matrix. A comparison of the mycelium with that of *actinomyces*, *Blastomyces albicans*, and of *aspergillus*, brings out its morphological likeness to the last named; whilst the rarity with which sporothrix produces mycelium in the living body, and the fact that when this does occur the mycelium is accompanied by the presence of ovoidal yeast-like "spore-bodies," would exclude a sporotrichosis. Such a view of its mycotic pathogenesis harmonises, also, with the observation that in certain of the cases the disease has in its course affected not only the antrum, but parts of the nasal cavity.

REPORTS FOR THE YEAR 1914 FROM THE EAR AND THROAT DEPARTMENT OF THE ROYAL INFIRMARY, EDINBURGH.

Under the care of A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.

PART II.

STATISTICAL TABLES.

By T. RITCHIE RODGER, M.D., F.R.C.S.E.,

Senior Clinical Assistant.

AFFECTIONS OF THE NOSE.

(1277)

I. *The External Nose and Nasal Vestibule.*

Deformities	4
Injuries, including fractures	22
Collapse of alæ nasi	1
Abscess of vestibule	1
Furuncle on floor of vestibule	1
Dermatitis of vestibule	35
Tubercular disease	1
Lupus	3

Rodent ulcer	1
Erysipelas	1
Epithelioma	1
Simple tumour (papilloma)	1

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II. *The Nasal Cavities.*

Deflection of septum	367
Hæmatoma of septum	2
Abscess of septum	3
Perforation of septum	11
Ulcer of septum	3
Bleeding polypus of septum	3
Syphilitic disease of septum	8
Tubercular disease of septum	1
Injury to septum	3
Edema of septum	1
Papilloma of septum	1
Acute, subacute, and chronic rhinitis	181
Membranous rhinitis	1
Inferior turbinal enlargement	262
Polypoid middle turbinals and nasal polypi	85
Purulent rhinitis	17
Atrophic rhinitis (non-fœtid)	26
Atrophic rhinitis (fœtid)	47
Rhinitis sicca	25
Epistaxis	47
Lupus of nasal mucous membrane	7
Syphilitic disease of nasal cavities (tertiary)	11
Foreign bodies	2
Nasal neuroses (including asthma)	85
Simple tumours	3
Malignant tumours	2
Anosmia	1

 1205

ACCESSORY NASAL SINUSES.

(115)

Acute antral catarrh	4
Acute antral suppuration	4
Chronic antral suppuration	47
Naso-antral (choanal) polypi	15
Acute frontal sinus catarrh	1
Acute frontal sinus suppuration	3
Chronic frontal sinus suppuration	5
Chronic ethmoidal sinus suppuration	11
Chronic sphenoidal sinus suppuration	2
Chronic fronto-maxillary suppuration	1
Chronic frontal, ethmoidal, and maxillary suppuration	2
Chronic ethmoidal and maxillary suppuration	3
Pansinusitis	7
Pansinusitis with orbital abscess and optic atrophy	1
Dental cyst invading antrum	4
Malignant disease of accessory sinuses	5

 115

AFFECTIONS OF THE MOUTH.

(44)

Cleft palate	2
Insufficiency of hard palate	1
Other deformity of palate	1
Oral sepsis	8
Specific disease of palate	6
Specific disease of tongue	7
Malignant disease of palate	3

Malignant disease of tongue	3
Lupus of palate	2
Tubercular disease of hard palate	1
Herpes	1
Pyorrhœa alveolaris	2
Alveolar abscess	1
Periostitis	1
Acute cellulitis of floor of mouth and submaxillary tissues	1
Oral neuroses	3
Lingual varix	1
	<hr/>
	44

AFFECTIONS OF NASO-PHARYNX, PHARYNX, AND FAUCES. (1561)

Adenoids and enlarged tonsils	1278
Simple tumour of naso-pharynx (vascular fibroma)	1
Malignant tumour of naso-pharynx	1
Acute tonsillitis	48
Tonsillar abscesses	19
Diphtheria	8
Acute pharyngitis	15
Chronic pharyngitis (including granular pharyngitis)	48
Pharyngitis sicca	21
Keratosis pharyngis	4
Hypertrophy of lingual tonsil	7
Lupus of naso-pharynx and pharynx	1
Tuberculosis of naso-pharynx and pharynx	2
Secondary syphilis of naso-pharynx and pharynx	12
Tertiary syphilis of naso-pharynx and pharynx	14
Simple tumours of pharynx	2
Malignant tumours of pharynx	13
Foreign bodies in naso-pharynx and pharynx	10
Paralysis of soft palate	8
Sensory neuroses	29
Vincent's angina	5
Abnormal conditions of uvula	8
Abnormal conditions of Eustachian cushions	5
Partial congenital occlusion of choanae	1
Herpes of palate and pharynx	1
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1561

AFFECTIONS OF THE LARYNX.

(165)

I. *Acute.*

Acute catarrhal laryngitis	20
Acute oedematous laryngitis	3
	<hr/>
	23

II. *Chronic.*

Chronic catarrhal laryngitis	29
Laryngitis sicca	11
Vocal nodules	6
Pachydermia of larynx	3
Lupus of larynx	1
Tubercular disease of larynx	30
Syphilitic disease of larynx (secondary)	3
Syphilitic disease of larynx (tertiary)	4
Fixation of left vocal cord	2
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	89

Simple: III. *Tumours.*

Papilloma	2
Angioma	2
Cyst	1
Unclassed	1

Malignant:	
Intrinsic epithelioma	3
Extrinsic epithelioma	7
	<hr/>
	16

IV. Affections of the Nerves.

Functional aphonia (adductor paralysis)	10
Recurrent paralysis of left vocal cord	10
Recurrent paralysis of right vocal cord	4
Bilateral abductor paralysis	1
Sensory neuroses	3
	<hr/>
	28

V. Miscellaneous.

Foreign bodies	2
Stenosis of larynx	1
Keratoses of larynx	1
Laryngeal cough	1
Voice strain	1
Simple goitre	12
Exophthalmic goitre	3
	<hr/>
	21

AFFECTIONS OF HYPOPHARYNX AND OESOPHAGUS. (37)

Stricture:	
Malignant (post-cricoid)	13
Malignant (middle and lower end of oesophagus)	6
Doubtful malignancy	2
Foreign bodies	14
Neuroses	2
	<hr/>
	37

AFFECTIONS OF THE EAR. (1604)

I. The External Ear.

Congenital malformations	1
Cyst	1
Injury	1
Cerumen	117
Furunculosis	47
Impetigo	1
Otitis externa diffusa	43
Hyperostosis	2
Foreign bodies	7
	<hr/>
	220

II. The Middle-ear Cleft.

Eustachian obstruction	183
Acute non-suppurative otitis media	89
Chronic non-suppurative otitis media	93
Acute suppurative otitis media	150
Acute suppurative otitis media with mastoid complications	43
Chronic suppurative otitis media	386
Chronic suppurative otitis media with mastoid complications	85
Tubercular otitis media	12
Sequele of chronic middle-ear suppuration	93
Otosclerosis	59
Mixed middle- and inner-ear deafness	32
	<hr/>
	1225

Intra-cranial complications of suppurative otitis media :

In ten cases complicating acute otitis media.

In fourteen cases complicating chronic otitis media.

Extra-dural abscess in middle fossa	3
Thrombosis of sigmoid sinus	5
Serous meningitis	1
Cerebro-spinal meningitis	1
Purulent meningitis	12
Cerebral abscess (temporo-sphenoidal)	2
Cerebellar abscess	2
Septicæmia	2
Pyæmia	1
	<hr/>
	29

C. *The Inner Ear.*

Congenital affections of internal ear (including deaf-mutism)	12
Acquired deaf-mutism	1
Noise-deafness (including shell- and other occupational deafness)	22
Labyrinth suppuration	16
Congenital syphilis of internal ear	9
Senile changes of internal ear	22
Menière's symptom-complex	1
Inner-ear deafness from unclassified causes	47
	<hr/>
	130

MISCELLANEOUS CASES, 191.

(These include cases sent from the general and other special wards of the hospital and include enlarged cervical glands, skin diseases, headaches of obscure origin, mental defects, eye cases, dental caries, etc.)

TABLE OF OPERATIONS.

<i>The Nose.</i>		(366)
Submucous resection of septum		112
Spine removed from septum		3
Removal of bleeding polypus of septum		2
Abscess of septum		2
Turbinectomy		101
Nasal polypi		108
Paraffin injection		1
Curetting for lupus		5
Foreign bodies removed		2
		<hr/>
		366
<i>The Accessory Sinuses.</i>		(155)
Antrum :		
Proof puncture of maxillary sinus		102
Radical operation, including choanal polypi		35
Radical operation with removal of syphilitic sequestrum		1
Dental cysts		3
Radical operation on frontal sinus		7
Ethmoidal curetting		5
Sphenoidal sinus		1
Orbital abscess incised		1
		<hr/>
		155
<i>The Pharynx.</i>		(1025)
Adenoids and tonsils (by guillotine)		963
Tonsillectomy by dissection		46
Peritonsillar abscess		15
Pharyngeal fibroma		1
		<hr/>
		1025

<i>The Larynx, Trachea, and Œsophagus.</i>		(84)
Tracheotomy		3
Intubation		2
Removal of laryngeal papilloma		4
Removal of laryngeal granulations		1
Removal of vocal nodules		6
Removal of adenoma of larynx		1
Tracheoscopy		5
Bronchoscopy		1
Œsophagoscopy and suspension laryngoscopy		47
Foreign body removed from Œsophagus		14
		84
<i>The Ear.</i>		(264)
Furunculosis		15
Paracentesis		44
Aural polypi removed		17
Granulations curetted		2
Aural cyst removed		1
Foreign bodies removed		7
Abscess over mastoid		3
Shrapnel removed from mastoid		1
Schwartz operation		42
Radical mastoid operation		94
Plastic operation after Schwartz		8
Modified radical		2
Exploration of lateral sinus		9
Ligature of internal jugular		6
Extradural abscess		3
Temporo-sphenoidal abscess		2
Cerebellar abscess		2
Labyrinth operation		5
Jugular bulb operation		1
		264
Miscellaneous: Intra-venous injection of neo-salvarsan		9
<i>Anæsthetics.</i>		
Local anæsthesia		637
Ethyl chloride		964
Chloroform		17
Chloroform and ether		194
Intra-tracheal administration of ether		2
		1814
New patients during 1914 = 3380.		

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

November 6, 1914.

Dr. G. WILLIAM HILL, *President, in the Chair.*

Aspergillosis of the Nasal Accessory Sinus.—H. Tilley.¹

Mr. HARMER said that in this case fungus could be grown, and it was found to be typical *Aspergillus fumigatus*. The symptoms in his

¹ See page 145 of the present issue.

case were very similar to those described by Mr. Tilley, but there had been great difficulty in curing them: ordinary drainage and washing out of the antrum was useless. In his own case probably the ethmoidal region was also involved. The symptoms could be controlled by giving large doses of iodide of potassium, but the fungus tended to recur, and the case was still un cured, though treatment commenced eighteen months ago.

The PRESIDENT expressed the gratitude of the Section for Mr. Tilley's clear description of the clinical symptoms, and for Mr. Shattock's lucid explanation of the pathology of this newly described disease, which might be designated *morbus Tilleyi*. In reference to the statement that potassium iodide sometimes had a favourable effect on this condition, it was to be noted that in an allied mycotic disease, actinomycosis, it had been claimed that iodide sometimes acted so well that radical surgical measures became unnecessary.

Dr. D. R. PATERSON said he had known a case where an aspergillus was found in the contents of the lacrymal sac. It was thought to have entered through the nose by the lacrymal duct and established itself upon a condition which had existed for some time. He wondered whether, in Mr. Tilley's cases, the aspergillus was grafted on to some old suppurative condition.

Mr. TILLEY replied that he was unable to answer Dr. Paterson's question. He could get nothing but an indefinite history of pain, sneezing, etc. He thought that the aspergillus gained an entry to the nose and sinuses and caused the symptoms, rather than that it was grafted on to a chronic empyema. It was a point which might be settled in some future cases.

Mr. SHATTOCK replied that it was quite possible, of course, that an aspergillary infection might be grafted upon a commoner suppurative condition, *i. e.* that the infection might be mixed, as it might be in cases of pulmonary aspergillosis.

December 4, 1914.

Intrinsic Epithelioma of the Larynx One month after Laryngofissure.—Sir StClair Thomson.—This gentleman, aged sixty-nine, was shown at the last meeting in November.¹ The whole of the left vocal cord was then replaced by a red, knobby, ulcerating infiltration. The cord moved well and there were no enlarged glands.

On November 12, under chloroform anaesthesia, the usual laryngofissure was carried out. The growth was found limited to the central three-fifths of the cord, which was clipped out intact in one piece, including the vocal process of the arytaenoid. No Hahn's tube was used. Patient swallowed liquids easily the same day and was out of bed within twenty-four hours, eating semi-solid food.

The microscopic examination of the removed left cord showed the structure of an early epithelioma, consisting of a downgrowth of altered squamous epithelium into the underlying tissues. Examination of sections showed that this growth had not penetrated to any distance, and that ample healthy tissue had been removed deeply and anteriorly. But posteriorly the growth had spread right up to the line of excision in the subglottic area—*i. e.*, just below the vocal process of the arytaenoid.

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., March, 1915, p. 133.

As, from the pathologist's point of view, excision could not be looked upon as complete in this region, a second laryngo-fissure was done on November 20, a fortnight ago to-day. The intra-laryngeal wound looked well. The bare stump of the arytenoid cartilage showed that the cord had been removed close up to the arytenoid base. A sweep of tissue subglottic to this area was removed and this was submitted to the pathologist, who reports as follows: "The subglottic tissue was divided into three portions and each piece cut. The middle piece shows a tiny down-growth of squamous epithelium into the sub-epithelial tissue, which, in view of the known facts of the case, is certainly the posterior edge of the epithelioma. The other sections are free of growth, and hence removal is now doubtless complete."

Patient made as rapid a recovery as after the first operation. He was walking about out of doors a week later. For a week he has been allowed to whisper. There is only a little sinus in the neck leading down to a bare portion of the thyroid cartilage.

Sir STCLAIR THOMSON said, in reply to the President (Dr. William Hill), that he would briefly describe this technique, which was only a simplification of the procedure laid down by the late Sir Henry Butlin and Sir Felix Semon. The patient was prepared in the ordinary way and the line of incision was injected with eudremine, a mixture of adrenalin and eucaine. As a consequence no vessel required tying and only one vessel had to be clamped throughout the operation. After trying various anaesthetics he had reverted to chloroform. The incision was carried down to expose the thyroid and trachea; then he took an ordinary hypodermic syringe, filled it with 2 per cent. cocaine, and stabbed the trachea before opening. He believed he obtained the idea from an American paper, and Mr. Hope and he had used it for a year or two, both in private and at King's College Hospital. There were several present who saw the operation three weeks ago, and they would agree as to the way in which this intra-tracheal injection abolished the very inconvenient spasm which used to occur on opening the trachea, causing a great spurt of blood and mucus over the vicinity. One waited a little after the stabbing and when the tracheotomy tube was inserted there was no reaction. For years past he had abstained from using the Hahn's tube. After splitting the thyroid he put in a tethered sponge from above, and that prevented the blood from getting into the air-passages, and was more reliable than the Hahn's tube. When the growth was exposed three weeks ago, it was exactly as shown in the drawing. He clipped it all round. But he wished to confess to an oversight which he must have made. He took the growth out whole and examined it with his finger to appreciate the cartilaginous consistency, and inspected it with the naked eye; and there seemed to be a clear space all round. Several of those present at the operation agreed that he had gone wide of the growth, and that the result was promising. The specimen was sent to be microscoped, and he asked that three sections should be made. One section showed epithelioma in an early stage; the growth being superficial. The epithelioma was on the surface of the cord, but did not extend into the ventricle of Morgagni, though it was well down on the subglottic area. Still, removal was free of the growth above, below, and deeply. The second section from the anterior end was also free. A section was also made posteriorly through the vocal process, and the report was that at one part the growth came so close to the edge that it was doubtful if the operation had gone beyond it. In view of this latter finding, he felt that there was no course open but to go back and do his work nearly all over again.

Though the patient was aged seventy, and had a blood-pressure of 200, he opened up the larynx again in ten days. The cut edge of the vocal process was visible. He took away a piece (indicated) which might have been removed at the first operation. In that corner it did show a thickening of the epithelial cells. He had two cases last summer in which there was no recurrence, and in both the disease had extended farther into the subglottic region; and if the growth extended far it got in between the thyroid and cricoid, and one could not get beyond it. The danger zone extended back not only into the arytaenoid but into the subglottic region. He urged the importance of looking into the subglottic region, chiefly posteriorly.

The PRESIDENT said the supplementary details to which they had listened were most valuable. Sir StClair Thomson used the term "laryngo-fissure" as the operation performed, but he (the speaker) imagined it was only fissure of the thyroid cartilage. When he used the term "laryngo-fissure" as synonymous with thyro-fissure, Sir Felix Semon used the term "thyrotomy" or "thyro-fissure" for the minor operation, and reserved the term "laryngo-fissure" for vertical median section of the thyroid and the cricoid cartilages. Mr. Tilley had spoken of thyrochondrotomy as more exact than either thyrotomy or thyro-fissure. Sir StClair Thomson's remark about the danger of leaving some of the disease behind appealed to him, because about eighteen months ago he operated upon a similar case—which was still alive without recurrence—and he found he had to remove the arytaenoid cartilage as well to be perfectly certain of getting at least a $\frac{1}{4}$ -in. margin of mucosa free from the disease. It undoubtedly complicated the operation to remove the disease from the anterior surface of the cricoid plate together with the arytaenoid. In his case there was trouble in breathing and swallowing through œdema of the aryepiglottic fold left behind, which flopped about like a polypus and had to be snared, and, owing to absence of the arytaenoid, for a time food had to be given through a tube to prevent its entering the trachea.

Dr. JOBSON HORNE said that, when he saw the series of three sections of the vocal cord exhibited on the lantern screen, he regretted not having had the opportunity of examining them under the microscope. It was, therefore, with reservation he raised the question as to the nature of the growth. So far as one could draw conclusions from seeing the sections on the screen, he doubted whether the growth were an epithelioma. There was a redundancy of epithelial tissue along that portion of the cord which is covered with squamous epithelium. He asked whether there was any infiltration of this epithelial overgrowth—that was to say, whether the basement membrane had been broken through, and whether there was an ingrowth into the substance of the cord itself. When the case was shown prior to the operation, favourable comment was made by more than one speaker, in view of the diagnosis of malignant disease, upon the remarkable free mobility of the vocal cord. That mobility would suggest infiltration had not taken place. The section exhibited reminded him of some he had met with in studying pachydermia of the larynx. Of course he was not suggesting that the case had presented clinically the typical text-book picture of pachydermia of the larynx; the sections on the screen suggested pachydermia as the pathological condition. He hoped that Sir StClair Thomson would afford them the opportunity of studying the very instructive sections under the microscope.

Dr. DAN MCKENZIE said he was interested in the remark concerning the removal of a portion of the arytaenoid, because in a thyrotomy which

he had done six or eight weeks ago he found it to be necessary to carry the removal well into the arytaenoid region; as a result, swallowing was incommoded, and the food came through the tracheotomy tube. The patient developed septic pneumonia, which had proved fatal. There seemed to be borderline cases, in which one was tempted, after having opened the thyroid cartilage, to proceed to remove as much of the disease as could be seen. But in doing so one damaged the swallowing; and in such cases the mortality would necessarily be higher than if the operation were limited to the cases for which the operation was primarily intended. The moral was that when the growth extended beyond the limits proper to classical thyrotomy the larynx should be removed. It was praiseworthy of Sir StClair Thomson to have opened up the larynx a second time and to have removed the portion of disease left behind. Many, in similar circumstances, would have been tempted to leave it alone and trust to Providence. He hoped his effort would be crowned with success. When the patient was first shown no specimen, he believed, had been removed for examination; so that the operation was undertaken upon a diagnosis reached without assistance from the pathologist. Probably Sir StClair Thomson would not advise this course in a routine way; and though there might be rare cases in which it was impossible to remove a portion for the pathologist he (the speaker) would be very chary of operating on any case in which an attempt had not been made. It seemed to him the attempt at least should always be made before proceeding to thyrotomy.

Mr. HERBERT TILLEY said that in 1907 he published a case of ordinary thyro-fissure, in which he removed the arytaenoid of set purpose, because the disease extended so far back. The patient got well, and lived for nine years afterwards, then died of recurrence in the other cord. On two or three occasions he had removed half the arytaenoid so as not to disturb the anterior part of the lower pharynx. Last year he operated upon a case which Sir Felix Semon had operated upon fifteen years ago; and at the operation a small abscess was discovered with necrosis of the arytaenoid cartilage, surrounded by suspicious looking granulations. The patient lived for nine months, but recurrence of epithelioma took place. Feeding became difficult, and gastrostomy was performed. The patient died with an extensive recurrence over the front of his neck. Probably that had been recorded as a "cured" case, but it showed us that because there was no recurrence of cancer within two or three years of operation it was unwise to speak of "cure." He had not used a Hahn's tube for ten years. He performed a tracheotomy in these cases, packed a long strip of a gauze above it—in the trachea—and then split the larynx.

Mr. W. STUART-LOW said he had as a patient a gentleman, aged sixty-nine, who appeared to have the same condition. He had been treating him for two years for what he diagnosed as pachydermia laryngis. There was a marked levelling up of the inter-arytaenoid space and a thickening and rough-looking appearance of the left vocal cord, but no impairment of movement. What had decided him against this being malignant was, that on palpating the cord with the finger through the mouth—and it was quite possible to do so—there was apparently no induration.

Mr. NORMAN PATTERSON suggested that the microscopic section should be submitted to the Morbid Growths Committee.

Dr. DUNDAS GRANT said it was possible to remove the lower part of the arytaenoid cartilage and leave the upper part. He had done that, and found it satisfactory. It was important to preserve the attachment of the sphincter laryngis if possible, for it diminished regurgitation of

liquid during drinking, which was, of course, a most serious complication.

Mr. O'MALLEY said the diagram drawn by Sir StClair Thomson showed that the growth had gone beyond the area which was normally covered with squamous epithelium. It reached into the subglottic area, and that seemed to confirm its being an epithelioma.

Sir STCLAIR THOMSON, in reply, said Mr. Gillies saw the specimen, and agreed that it was epithelioma. Still, he would be pleased to submit it to the Morbid Growths Committee.¹ He did not suppose Dr. Horne wished to suggest this as a favourite region for pachydermia laryngis, which had now been clinically defined as a thickening over the vocal process, not in the centre of the cord, as this was. Never having had a death himself, he agreed that this should be an operation free from risk! The risk was swallowing-pneumonia. Of some twenty cases, he had had to feed only one through the nose for a week or two. Removing part of the arytenoid complicated the condition. On looking into the larynx a week later, one saw a horrible edematous condition of the remains of the arytenoid, and frequently of the other arytenoid. In one case he had to enter again, by the direct method, and get the shifting mass out. He agreed with Dr. McKenzie as to the desirability, if possible, of removing a portion beforehand for examination. But in this case he did not think that was feasible: and if the report had been negative he would still have gone on with the operation. Therefore, of what use would a preliminary examination have been? As he had learned from Dr. Bond, of Golden Square, he was accustomed to feel with his finger round the epiglottis and introitus of the larynx, but he had never got as far as the glottis in adults.

Demonstration of Foreign Bodies removed from Air-passages.
—Sir W. Milligan.—(1) *Damson-stone removed from Left Bronchus.*—A boy, aged four, while eating damson jam accidentally inhaled a stone. Sharp attack of dyspnoea. During following ten days several attacks of dyspnoea accompanied by spasmodic attacks of coughing. X-ray examination negative. On admission to hospital the child was found to be suffering from slight bronchitis with diminished entry of air into left lung. Examination under general anaesthesia. Sudden arrest of respiration: performance of rapid tracheotomy and artificial respiration, followed by recovery. Child put back to bed for half an hour; again anaesthetised; tracheotomy tube withdrawn and bronchoscope tube passed. Damson-stone seen in left bronchus with pointed end protruding (specimen shown). Successfully recovered with forceps. Rapid recovery.

(2) *Carpet-tack removed from Bronchus of a Female.*—Female, aged thirty-five, accidentally inhaled a carpet-tack which she was holding in her mouth when engaged tacking down a carpet. Sudden and severe paroxysm of dyspnoea. During the following four days several slight attacks of dyspnoea and coughing fits. Admitted to hospital eight days after accident. (X-ray photograph shown of the tack *in situ*.) Under general anaesthesia tack grasped, but on traction being made forceps slipped off. Many unsuccessful attacks at extraction made. Patient kept quietly in bed for three days. Vapor benzoin co. administered every two hours. Patient again anaesthetised and removed to X-ray dark room. Fluorescent screen employed and forceps made to grasp tack. Withdrawal again unsuccessful owing to forceps not holding the stem of the tack

¹ The Committee have since reported on the growth as being a typical epithelioma.

sufficiently firmly. Many more unsuccessful attempts at extraction, until an attempt was made to twist the tack round on its own axis. After much trouble this was accomplished and the tack was immediately withdrawn by grasping its head (specimen shown). Despite prolonged manipulations on these two occasions no systemic disturbance followed, and the patient left hospital upon the third day in perfect health.

(3) *Halfpenny in Œsophagus of a Child, aged two.*—Coin readily seen impacted at about the level of the sterno-clavicular joint. *In situ* for ten days. Removal with forceps. Œsophageal wall intact. Rapid recovery (specimen shown).

These cases demonstrated: (1) The tolerance of the tissues under certain conditions; (2) the advisability, if not necessity, of not relying upon the results of radiography; (3) the value of the fluorescent screen as an aid to the removal of foreign bodies from the lung.

The PRESIDENT recommended the method which he had first seen Mr. Tilley use for removing a foreign body from the bronchus—viz., having the patient on the X-ray table and guiding the forceps by means of the screen. He had himself succeeded on one occasion in which he had previously failed to get the foreign body by the ordinary procedure.

Mr. TILLEY suggested that in the case of a foreign body in the lung, where good definition was not achieved, instantaneous radiography would then secure good definition. He agreed that one must not absolutely rely on the results of radiography.

Sir STCLAIR THOMSON said one was often successful when trying to remove the whole apparatus *en masse*, because it had happened to him more than once that the head of a shawl-pin or a reversed tack had caught against the end of forceps, and the forceps came out minus the foreign body. And in the case of larger things, such as tooth-plates, one could pretty safely remove the whole thing together.

Dr. D. R. PATERSON had had a case similar to the second case, and as he could not get enough control over the tack with a long forceps he did a low tracheotomy. A shorter forceps enabled him to manipulate and extract very easily. The child was about three years of age.

Dr. IRWIN MOORE asked Sir William Milligan whose forceps, or which type of forceps, he had used in this case? If Brünings' forceps were used, which end had been tried? He ventured to say that if Sir William Milligan had used the forceps which he (Dr. Moore) had introduced two years ago for use with Brünings' tubes for the removal of foreign bodies, the difficulties met with in this case would not have been experienced. The forceps introduced by Brünings as shown by this case would grasp a tack by the stem, but the grip would not hold—this was the weak point of the forceps in the removal of foreign bodies. Whereas the forceps which he (Dr. Moore) had introduced would easily grip a tack by the point, firmly hold it, and successfully remove it. He had shown this forceps at the British Medical Association Meeting at Liverpool in 1912, and since then it had been used by many of his colleagues. In fact, he had not known of a failure when this forceps had been used.

The PRESIDENT said that Brünings' and Killian's forceps were very fragile, and cases had been recorded in which, instead of one foreign body in the patient, there were three—the original foreign body and two portions of forceps. Dr. Irwin Moore's Œsophageal forceps was a good instrument.

Mr. O'MALLEY said he had had some similar experiences when trying to extract foreign bodies with Brünings' forceps: the pressure of the spring of the forceps tended to withdraw the prehensile portion into the

easing, and it was difficult to be sure whether a small object was really being grasped. For this reason he considered that Dr. Irwin Moore's forceps was a decided improvement on Brünings'.

Mr. E. D. D. DAVIS said he had been collecting records of cases similar to the third one. In this case there was neither the history of the swallowing of a foreign body nor the indication for a skiagram, and a diagnosis was well-nigh impossible; but in some cases there was a history of the swallowing or inhalation of an object, but enough attention had not been paid to it. For example, in one case a swallowed halfpenny lodged in almost the same position and ulcerated into the aorta, and the child, aged seven, died of hæmatemesis. The history was that about five years after the swallowing of the coin he had vomited a little blood, and in the night he had a profuse hæmorrhage and died. In another case an ordinary pin had passed through the œsophagus into the aorta, and the patient died from hæmorrhage. Dr. Rolleston sent a case to him at Charing Cross Hospital, with the history that four months ago a rabbit-bone had been swallowed. At the casualty department of another hospital not much attention was paid to the history, and the child was sent away. It returned a week or two later, and was admitted and treated for bronchitis for three weeks, and then discharged; a week later it was sent to the Fever Hospital as a case of diphtheria. Dr. Rolleston, suspecting a foreign body, sent the case to him (the speaker). He examined the child with the laryngoscope and a greyish object was seen, which he felt confident was the lost rabbit-bone. The bone was impacted edge-on between the vocal cords, so that there was room for air to pass on either side. Had it fallen flat the child would probably have been suffocated. The bone was removed by Killian's suspension laryngoscopy under chloroform. In a case of his own a safety-pin was removed by the same method; the pin was open and sticking into the wall of the pharynx opposite the cricoid cartilage. His colleague, Mr. Waggett, and he had been in the habit, when a patient was alleged to have swallowed or inhaled a foreign body, of making an ordinary examination of the pharynx and larynx; sometimes a sharp foreign body lodged in the tonsil or the base of the tongue. If that failed, a skiagram was taken, the stools watched, and finally they resorted to the œsophagoscope or bronchoscope, but in every case the foreign body should be accounted for. Many foreign bodies had been missed because the history was difficult to obtain, or the child had very few and slight symptoms, or symptoms simulating other affections. This child was difficult to examine: she had glands in the neck, aphonia, stridor, etc., and he thought she had enlarged mediastinal glands. At a second examination with the laryngoscope a few minutes later he could see the bone in the larynx. Suspension laryngoscopy was therefore performed under chloroform. He did not attempt to feel the bone with the finger, because of the danger of dislodging the bone and producing severe dyspnoea.

Sir WILLIAM MILLIGAN, in reply, said he had been in the habit of carrying out removal *en masse*. The point raised by Dr. Paterson, as to more frequently doing a low tracheotomy in these cases, was an important one. He had gone on the rule that in young children it was advisable to do a low tracheotomy; but not in adults. He had nothing but praise for Dr. Irwin Moore's forceps, which had the best grasp of any forceps he had ever handled. That of Brünings was really a toy when it came to anything serious. Had it not been for the help of the radiologist, the foreign body would have been there still. He agreed that one should not rely entirely on the radiogram. He had had the radiographer's reports

that there was no foreign body present, yet he had found them with the bronchoscope. In one case a child swallowed a bean, and in ten days it had marked respiratory dyspnoea. But the radiogram was negative. He found the bean lying on the carina. During the ten days some portion of the bean must have got detached, for septic pneumonia followed by a lung abscess developed, and the child died.

Inoperable Angio-fibroma; Maxillary Antral Sarcoma (?) (Microscopic Section.)—Sir W. Milligan.—Patient, a male, aged seventeen. Three years' history of unilateral nasal growth. Two attempts at removal had been made before he came under observation. Patient complained of left-sided nasal obstruction and intermittent attacks of hæmorrhage and pain. The left nasal passage was completely blocked by a polypoid growth with smooth, glistening surface traversed by somewhat enlarged blood-vessels. On posterior rhinoscopy the growth was seen to occupy a considerable portion of the nasopharynx. The soft palate was pushed forwards. The left side of the face appeared much swollen, due to distension of the bony walls of the antrum. The antrum was quite opaque upon transillumination.

Operation: Kuhn's per-oral intubation tube was passed and the mouth was packed with gauze. Lateral rhinotomy was performed. On attempting to remove the growth there was furious hæmorrhage. The cavity was rapidly packed. Several attempts were made to remove the growth, but unsuccessfully on account of the extraordinarily severe bleeding. Patient collapsed and the operation was stopped. The cavity was tightly packed with gauze and saline administered. Forty-eight hours afterwards the packing was removed; again there was very severe hæmorrhage. Radium emanation tube (50 mgrm.) was inserted into the middle of the growth. No return of hæmorrhage. Rapid retrogression of growth. Three weeks afterwards there was no trace of growth, but a dense, firm, fibrous mass was found attached to the posterior antral wall (microscopic section shown). The general and local condition of the patient was now excellent.

The PRESIDENT noted that the case was a hæmorrhagic one, and that radium had acted as a hæmostatic. He had usually embedded from underneath the lip, and he had no serious hæmorrhage. In one case of sarcoma of the anterior wall of the antrum it disappeared completely under radium in two days without embedding.

Dr. JOBSON HORNE inquired about the site of origin of the growth; whether it arose in the basi-sphenoid and spread to the antrum, or within the antrum and extended to the adjacent parts. That point had an important bearing on the treatment. To get rid of such growths it was necessary to get behind them and to attack the seat of origin. Dr. Jobson Horne preferred the title angio-fibromatosis before the second title, suggested by the exhibitor, of maxillary antral sarcoma. Some years ago he had given reasons for not regarding these growths as sarcomata. They destroyed by local extension and not by metastases. The growths consisting mainly of embryonic tissue rapidly retrogressed under radium.

Mr. TILLEY said he had had to deal with a case in which a large growth seemed hopeless in nature and situation, but after putting in radium it had disappeared completely; there was now no disfigurement. Ten days after putting in the radium he passed an exploring needle into the antrum and washed out a quantity of very foul smelling material. He asked why Sir William Milligan preferred to operate before using the radium.

The PRESIDENT said many believed in applying radium in the first instance in cases of sarcoma. He had a case of growth the size of a turnip at the hospital, and 200 mgrm. of radium were being applied at the moment. It was a mixture of round and spindle cells, which did not yield so well to radium as one of purely round cells.

Mr. HUNTER TOD asked whether, in these cases, the exhibitor had tied the external carotid. He had done so recently in a similar case, with the result that there was practically no hæmorrhage.

Dr. DUNDAS GRANT thought it an encouraging illustration to the use of radium, and asked how long it was since the operation was done; he presumed long enough to test whether there was likely to be recurrence. Recently, with the aid of Dr. Knox, he introduced a tube of radium into the nasopharynx in a case of round-celled sarcoma, and caused absolute stoppage of the nose in consequence; there followed a most striking yielding of the growth to the radium and restoration of nasal patency. The patient did not come back, as agreed, a few weeks later to have it repeated, and he died. With Sir William Milligan's experience perhaps most members would try radium in the first place in such a case, as perhaps Sir William himself would. A firm fibrous mass was described. Was that information derived by inspection or palpation?

Sir WILLIAM MILLIGAN replied that he doubted if the growth was sarcoma: he regarded it as a vascular angio-fibroma. But the clinical aspects of the case made one think there must be something more at the bottom of it, because the growth had been twice removed before the patient came to the infirmary. Had he felt certain it was sarcoma he would probably have used the radium in the first instance, but he operated in the belief that it was a large vascular innocent growth. It grew from the posterior wall of the antrum, and extended back into the nasopharynx; it was not in the vault of the pharynx; there was a small space in which it did not touch the vault or the roof. He had tied the external carotid in a large number of similar cases, but he did not do it in this case; he could not say why, although when he did it in other cases it had proved of great advantage. His query in the title was due to the clinical course of the case. The operation was done three months ago. One of the immediate effects of the radium was to arrest the hæmorrhage, which at the time of the operation was furious. Though only 50 mgrm. were used the effect was wonderful. The remains of the growth could be seen from the front: there was practically no lateral wall of the antrum, it had been absorbed as the growth extended. There was need for a revision of ideas as to the degree of malignancy of these growths. Some which the microscope led one to think were very malignant turned out to be clinically quite mild.

Ulcerated Naso-antral or Choanal Polypus.—Herbert Tilley.—

Mr. Tilley said that when he looked at the polypus with the posterior mirror the mass looked like a tertiary syphilitic ulcer. He thought that what he saw by anterior rhinoscopy was œdema probably connected with the ulcer; the latter had a red, well-marked border, with sloughy base. On removal he found an ulcer the size of a shilling on the posterior surface of the polypus; he had never seen anything quite similar. He did not open the antrum, because out of many cases of choanal polypus he had only had to make a second removal in three of them. He evulsed them the first time with forceps, and if there was more than one recurrence he opened the antrum through the canine fossa.

Mr. CLAYTON FOX asked whether the polypus was cystic. A few

years ago he had to deal with a very decided case of this nature, in which he did two removals, and on each occasion 2 or 3 dr. of clear serous fluid escaped from the pedicle after removal. By means of a small mirror he could see through the accessory opening into the naso-antral wall.

Dr. DAN McKENZIE said, that sometimes antro-nasal polypi became gangrenous from kinking round the accessory opening. Possibly that accounted for the ulceration in this case. He agreed that single removal sufficed for most cases. German authorities contended that it was necessary to open the antrum in all such cases: but he dissented from that.

Dr. DUNDAS GRANT said it was desirable to make sure, by palpation, whether there was a large opening. Forceps could be guided into the antrum and one could tear and scrape away with the assurance that recurrence would not take place. But he had seen cases in which recurrence took place after a number of years.

Sir WILLIAM MILLIGAN raised the question as to the possibility of this ulceration having been self-inflicted by the use of the finger or the tongue. He had seen patients able to put their tongue to the very back of the nasopharynx.

Mr. CLAYTON FOX suggested that the ulceration might be due to simple friction and pressure.

The PRESIDENT said these cases did not often recur. Mr. Harmer had been injecting bismuth into antral cavities. The amount of bismuth used would give an indication of the size of the cavity: and if the antrum were filled with polypus its outline would be different from that seen in the normal antrum by X-ray examination. Whether it was worth while to fill up the antrum to make a diagnosis was a debatable matter.

Mr. TILLEY replied that the possible factitious origin of the ulceration had not occurred to him: but he did not think it was probable, because this patient had a long, narrow, high-arched palate, and it would have been impossible for him to insert his tongue into his nasopharynx. He believed there was always a cyst in these naso-antral polypi.

Retropharyngeal Gumma.—G. J. F. Elphick.—Patient noticed a "swelling in the throat" about the end of September, 1914, which caused slight difficulty in swallowing. There is a rounded swelling visible on the posterior pharyngeal wall towards the left, which has a definite right border, is hard to the touch, and not very tender. Patient has occasional pain radiating up the left side of the neck towards the head, and is certain that the swelling is getting larger. There are no enlarged glands in the neck. There is no limitation of cervical movements, and a skiagram excludes cervical caries.

The PRESIDENT said the Wassermann test was positive, and it was evidently a gumma. There was an obvious large swelling when first seen, and it was thought to be possibly a parotid tumour.

Tuberculoma of Nasal Septum.—C. W. M. Hope.—E. L.—, aged twenty-four, single. History of two and a half years' nasal obstruction right side, with very slight bleeding, and soreness at anterior nares. No pain. On admission to hospital: Pedunculated cauliflower-like growth from septum blocking up right anterior nares. Small patch of lupus scarring in post-nasal space: portion removed for microscopic examination from septal growth. Report from Dr. Emery: "Tuberculoma." Chest examination: No lung affection. Operation, November 11, 1914, under cocaine anaesthesia. Whole of right septal mucous membrane for a

distance of 2 in. from vestibule and almost up to roof found affected; removed by stripping away underlying perichondrium. Cartilage and bone not touched. Floor of nostril and inferior meatus found affected and treated in the same way. Anterior two-thirds of superior turbinal also found affected and removed.

Dr. VINRACE asked whether there was evidence of tuberculosis or lupus in any other part of the body, or whether such existed at the present time. In effect, the diagnosis was primary tuberculosis of local nature in the nasopharyngeal space; and if that were correct one would have expected there would have been manifestations of the disease elsewhere. He would call it a chronic inflammatory growth.

Dr. JOBSON HORNE said the section exhibited under the microscope appeared to be stained for tubercle bacilli, but it was impossible to say whether they were present in the section, as it was not under an oil immersion. He had microscoped growths from similar cases of so-called tuberculoma of the nose, arising generally from the septum; he usually found a definite giant cell formation, but he could not find tubercle bacilli, and guinea-pigs inoculated with the tissue did not respond. It would be a pity to regard such cases as instances of primary tuberculosis of the nose.

Mr. HOWARTH said that giant cell systems were commonly seen in all granulomata. Clinically the condition was lupus.

Dr. DUNDAS GRANT said the difficulty of finding tubercle bacilli in lupus was well known. This case accorded with the typical description of that mitigated form of tuberculosis of the nasal septum, and it seemed a likely spot for infection. It was seen in people who had no other sign of tuberculosis.

Sir WILLIAM MILLIGAN doubted whether this was primary tuberculosis, from the clinical point of view. He regarded the case as lupus with proliferating granulomatous changes, the result of chronicity. He had never seen tubercle bacilli in a lupus section. He regarded lupus as a non-bacillary form of tuberculosis.

Mr. CLAYTON FOX asked what was the disposition of the giant cells in the pathological specimen? Were the giant-cells in the periphery? If so, it was in favour of lupus, which was modified tuberculosis.

Sir STCLAIR THOMSON, replying for Mr. Hope, said he had this case at heart, because he had watched a similar one for seventeen years. The present case was sent to his clinic as a suspected case of malignant disease, because of the fungating sessile growth on the right side of the septum. It had existed for some time, and the youth of the woman did not contra-indicate its malignancy. But as it had not penetrated the septum, and there were no enlarged glands, it was clinically non-malignant. He agreed that histologically it was a tuberculoma, and clinically it was lupus. He raised this question at the old Laryngological Society of London, and it involved him in a discussion with Prof. Massei, of Naples, who was so pathological that he wanted to abolish lupus, and class what was known as lupus as a mitigated form of tuberculosis. He (the speaker), however, held that it was important to distinguish between them. This was a sessile growth, going farther back than was expected, and on the posterior wall of the nasopharynx there was a glazed and infiltrated condition which he regarded as the next step in the lupus infection. He gave a diagram of what happened in a similar condition seventeen years ago. It was a case of tuberculoma shown by Dr. Watson-Williams at the old Society, and he had watched the growth penetrate into the other side of the nose, and infect the inferior turbinal and go

into the nasopharynx. The patient married, and he warned her against having children. But she did have children, and each pregnancy led to further extension of the disease. It invaded her larynx, and she developed it on her face; and she now had tuberculosis of the lung, and was probably dying. The giant-cell system was the only pathological evidence that this was early lupus in the form of a tuberculoma. Tubercle bacilli were rarely discoverable in the tuberculomata or lupus growths, although, of course, Koch's bacillus was the primary cause.

Enlarged Tonsils in Leukæmia(?).—C. W. M. Hope.—Male, aged twenty-nine, came to hospital on November 14, 1914, to have his tonsils removed. There was no complaint except that the tonsils had troubled him for the past few weeks. On examination: Tonsils size of large walnuts, rather hard, surface covered with irregular, dark navoid patches; masses of soft, movable glands, both sides of neck and in each axilla; bluish nodules in skin over chest and abdomen, up to the size of a shilling-piece; marked anemia. Diagnosis: ? Sarcoma of tonsils, with sarcomatosis cutis. Gland from neck and a nodule from skin of chest removed for microscopic examination. Report from Mr. Gillies: "Lymphatic leukæmia." Blood-count not made, as the patient has not been up to the hospital since his first visit.

Injury to the Nose with subsequent Deformity.—W. Stuart-Low.—*Case 1.*—A boy, aged four, who five weeks ago fell in the road and struck his nose. The nose bled considerably, but there was no abrasion of the skin. There is now a firm thickening on the left side over the alar cartilage and the frontal process of maxilla: the lower edge of the alar cartilage is retracted and the deformity is increasing. There has evidently been a periostitis and perichondritis, and some organisation of the extravasated blood. The swelling is unusually firm and is gradually increasing, and the lumen of the nostril is being narrowed. Suggestions as regards treatment are requested.

Case 2.—A girl, aged nine, who fell in the road five weeks ago, striking her forehead on a piece of iron. Rapid effusion of blood took place, but there was no abrasion. There is now present a hard mass above the left inner canthus, causing marked deformity. The friends say it is slowly enlarging. Excision is proposed.

In neither of these cases was there hematoma of the nasal septum, but in the case of the girl there was probably effusion of blood in the left ethmoidal region, as the nose bled freely and was obstructed for days.

Tubes of Soft Metal for Insertion into Nose after Submucous Resection.—Dan McKenzie.—The tubes are inserted immediately after the operation and the packing applied round them. Their use does away with the objectionable blockage of the nose inseparable otherwise from packing after resection.

Mr. HARMER said that he had used rubber tubes in the nose after submucous resection for four years. When placed in the inferior meatus they kept the septum in position and very little plugging was necessary. In most instances they enabled the patient to breathe comfortably through the nose. The use of tubes was originated by Mr. Walsham, who claimed that in addition to making the patient comfortable they acted as drains and prevented the formation of adhesions.

Dr. JOBSON HORNE said he was glad these tubes were being reintro-

duced. Mr. WALSHAM, he remembered, used ordinary rubber drainage-tubes passed through the nose after septum operations. The tubes were perforated. The perforating was an advantage.

SIR WILLIAM MILLIGAN agreed that they were excellent tubes, but it raised the question whether tubes were desirable at all.

MR. W. STUART-LOW thought this question would make an excellent subject for a set discussion.

DR. MCKENZIE replied that the tubes were not intended for drainage; they were for the patient to breathe through during the time the packing was in the nose. Pressure of the swelling caused rubber tubes to close. He thought anyone who had once tried his tubes for twenty-four hours after the operation would continue to use them.

New Growth of Tonsil and Faucial Pillars.—H. Clayton Fox.

The exhibitor thought the growth was an epithelioma; the pathologist, on the contrary, pronounced it to be an infective papilloma.

MR. STUART-LOW thought it was epithelioma. There was induration, and on palpation it was very firm. In a similar case radium administration had done good.

DR. VINRACE asked whether the Wassermann test had been applied, and why there was no glandular enlargement? The faucial pillar was eroded and infiltrated and had an angry appearance, and it was as likely to be syphilis as malignant disease.

DR. LEATHEM said he had examined the specimen and regarded it as infective papilloma. The most doubtful part of the specimen showed one or two epithelial masses resembling cell-nests, but on the whole he thought it was papilloma.

DR. DUNDAS GRANT regarded it as epithelioma; it was diffuse and ulcerated, and there were cell-nests. If so, it was a most instructive case, showing how latent a malignant process might be.

MR. CLAYTON FOX, in reply, said that Escat, in his work on diseases of the throat, mentioned the fact that cervical abscesses had been observed as the earliest manifestation of latent epithelioma of the pharynx. He believed that in this case the epitheliomatous growth had started in the supra-tonsillar fossa or in a palatine recess of the same. Wassermann's reaction had not been tested. He wondered whether the early overrunning of the area involved, together with the subsequent cicatrization, might not have had some influence in blocking the lymphatics, and thus accounting for the absence of glandular enlargement met with in this case.

Abstracts.

PHARYNX.

Conroe, Julina (York, Pa.).—The Use and Abuse of the Tonsils. "Journ. Amer. Med. Assoc.," October 17, 1914.

From a review of the literature and personal investigation the author attributes to the tonsil the following functions:

(1) Protective. The tonsils are generators of lymphocytes and leucocytes, which are undoubtedly present in large numbers, where they may even be stored up for ready action when called on, and that, in addition

to their specific bactericidal action, a constant stream of lymph from the depth to the surface exists, which alone would protect by counteracting an invasion of micro-organisms and by clearing the surface of these undesirable settlers.

(2) Defensive against absorption, by antagonising the entrance to their interior of infectious germs.

(3) Internal secretion endowing the tonsils with a physiological and biological function.

(4) Lubricant.

(5) Voice. The tonsils possess important mechanical, acoustic, and phonetic functions.

(6) Immunity. By a process of continual auto-vaccination the tonsils protect the body against chance infection.

In conclusion, Dr. Conroe enters an energetic protest against the "indiscriminate removal of the normal tonsil, but on the other hand, believes in the propriety of tonsillectomy":

(1) When these organs greatly interfere with respiration and thus lead to insufficient oxygenation of the blood; (2) when they are actually diseased beyond repair; or (3) when there is no reasonable doubt as to their being directly or indirectly an etiologic factor in the production of disease.

Birkett (Rogers).

NOSE.

Clegg, W., and Black, H.—A Case of X-ray Diagnosis of a Chronic Cerebral Abscess secondary to Frontal Sinus Suppuration. "Lancet," January 16, 1915, p. 124.

A soldier, with a fistulous opening in the right frontal region with persistent discharge. A radical operation showed polypoid degeneration in the sinus. Discharge persisted, and subsequent operation showed caries and necrosis in the posterior sinus wall. Radiography some months later showed, after injection of bismuth, that the latter collected in the frontal lobe of the cerebrum. The abscess thus located was operated upon with excellent result.

Macleod Yearsley.

LARYNX.

Citelli (Cantania).—Chordectomy in Cases of Stenosis due to Median Position of both Vocal Cords. "Zeitschrift für Laryngologie," Bd. vi, Heft 6.

This paper is really an answer by Citelli to a publication of Iwanoff's. The latter published a case (*Zeitschr. f. Laryngol.*, Bd. vi, Heft 4) of internal chordectomy for double median position of the cords. This operation allowed Iwanoff's patient to dispense with the tracheotomy tube, and yet enabled him to retain an audible, though hoarse, voice. Citelli criticises Iwanoff's article because the latter had used, and apparently given up, Citelli's method. Citelli points out the difference between chordectomy for cancer and for median position of the cords. In the latter the mucous membrane should be preserved as far as possible, whereas in the former the object is to be well clear of the disease. It is also necessary to avoid adhesions in the latter case and, therefore, necessary to leave the mucous membrane in the region of the commissures. Citelli published his paper in 1906, after numerous experiments on dogs; but in 1886 O'Dwyer and Hope had performed internal

chordectomy. Citelli believes that the external operation is more accurate, and further that all patients are not suited for endo-laryngeal methods. Gleitsmann was the first to perform external chordectomy for double abductor paralysis. He operated according to Citelli's method. Nicolai has carried out internal chordectomy and has used an intubation tube to prevent synechie. Citelli holds that intubation is not necessary after external chordectomy.

J. S. Fraser.

ŒSOPHAGUS.

Downie, Walker (Glasgow).—Œsophagotomy for the Removal of a Tooth-Plate. "*Glasgow Med. Journ.*," December, 1914.

The patient, male, aged twenty-four, bought on August 25th a syphon of lemonade, and to relieve his thirst, attempted to drink direct from the syphon. The fluid entered his mouth with great force, an attack of violent coughing followed, accompanied by a sense of suffocation, and he thought his tooth-plate was forced down his throat.

At the infirmary that night an X-ray examination gave no indication of the presence of a foreign body. For ten days he had pain on swallowing. The author then, by means of a bougie, detected the tooth-plate nine inches from the incisors. Bromide was administered, and next day the plate was seen with the œsophagoscope, but could not be dislodged. Attempts were made to break it with cutting forceps without any result.

A left lateral œsophagotomy was performed, and the plate removed. A soft india-rubber stomach tube was passed through the nose, and the wound left open and gently packed with iodoform gauze. The tube was kept in position for six days and then withdrawn, and nine days after the operation the wound healed up.

The firm impaction of the tooth-plate was due to a couple of sharp points at each end, which penetrated the wall of the gullet.

This is the fourth case of œsophagotomy performed by the author for the removal of a dental plate fixed by booklets, or firmly impacted in the gullet, and each patient has recovered completely with no subsequent œsophageal discomfort. The author emphasises the point that as little injury as possible must be caused to the gullet, both before and during the operation. The wound must be shaped so as to prevent the retention of any discharge, and it is important to treat the wound as an open one.

Andrew Wylie.

EAR.

Beck, Oscar.—Bone Conduction in Syphilis.¹ "*Annals of Otolology, etc.*," vol. xxii, p. 1099.

Beck contends that the regular occurrence of shortened bone conduction in syphilis and its practical value in diagnosis has not received proper recognition. He had made a careful study of bone conduction in syphilitics who complained of no ear symptoms, and in whom otoscopic examination revealed normal conditions. In an overwhelming majority of cases he found differences between normal hearing syphilitics and normal hearing non-syphilitics. He tabulates fifty-six cases. In only a small percentage is shortened bone conduction not found, and he believes the symptoms to be due to increased intracranial pressure.

Macleod Yearsley.

¹ See also *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, vol. xxix, p. 388.

REVIEW.

The Pharmacopœia of the Hospital for Diseases of the Throat, Nose, and Ear (Golden Square). Edited by CHARLES A. PARKER and T. JEFFERSON FAULDER. Seventh Edition. London: J. and A. Churchill, 7, Great Marlborough Street, 1914.

This, the seventh edition of the Golden Square Hospital pharmacopœia, "may," so says the preface, "be called the Jubilee edition because it is now fifty years . . . since the hospital was founded."

It would, of course, be an act of presumption were we to offer any adverse criticism upon the book. But that fact need not be taken as detracting from the value of whatever meed of praise we may be inclined to express.

As a matter of fact we have nothing but praise for it. The book is of a handy size, it is well arranged, and it is easy of reference, so that it ought to prove a useful stand-by against those too frequent occasions, when formulæ slip from the memory.

The task of deleting old or no longer fashionable remedies has evidently been tactfully accomplished, and if a tendency to the rather free use of the pruning-knife is visible here and there, we may overlook it as an indication that the fires of youth are not yet extinct in the Golden Square Hospital, in spite of its half century of strenuous existence. *Floreat!*

Dan McKenzie.

CORRESPONDENCE.

LONG STYLOID PROCESS.

To the Editor of THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

SIR,—In this month's JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, Mr Macleod Yearsley describes a case of abnormal styloid process causing irritation of the tonsil, and says that he is unaware of any such abnormality being diagnosed beforehand.

A similar case was sent to me by Dr. Walters, of Neath, twelve months ago. The patient was a woman, aged fifty-five. She had noticed something wrong in the left tonsil for five months, causing pain on swallowing. On examination the styloid process was found projecting through the tonsil for nearly quarter of an inch. Under cocaine I laid bare a considerable portion of the bone, and snapped it off without difficulty. She has not been troubled in any way with it since.

ALBAN EVANS,

Surgeon, Ear and Throat Department,
Swansea General Hospital.

4, NORTHAMPTON PLACE,
SWANSEA;

March 4, 1915.

NOTES AND QUERIES.

"Petrograd, March 13. Count Witte died to-night of meningitis. A few days ago he contracted a slight chill, which resulted in a mild attack of influenza. His doctors afterwards diagnosed inflammation of the ear, and this extending to the brain, he became delirious, and died without regaining consciousness."—*The Times*, March 15, 1915.

THE
JOURNAL OF LARYNGOLOGY,
RHINOLOGY AND OTOTOLOGY.

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BILATERAL LESION OF THE AUDITORY CENTRE.

By THOMAS GUTHRIE, M.A., M.B., B.C., F.R.C.S.,

Laryngologist and Aurist to the Liverpool Royal Infirmary.

BILATERAL lesion of the auditory centre in the brain is a very rare occurrence. I have been able to find records of only six cases of the kind, and in some of these the details are so meagre that it is doubtful how far they can be regarded as true examples of the condition.

(1) Mott's case. A woman, aged twenty, suffered from sudden loss of consciousness lasting three hours. There was no paralysis, but speech was lost for a fortnight and impaired for a month. Complete recovery took place, and the attack was thought to have been a hysterical one. As the sequel shows, however, it was in reality due to a lesion of the left auditory centre, and gave rise to word-deafness with temporary sensory aphasia. Some years later, after her marriage, two "fits" occurred, with an interval between them of three or four hours. The first of these—probably due to embolic occlusion of the posterior branch of the right middle cerebral artery—was followed by absolute and permanent deafness; the second—the result of blocking of the left anterior cerebral artery—produced paralysis of the right leg. The patient later became insane and died of phthisis in Claybury Asylum. The autopsy showed that the brain lesions were due to emboli from old

mitral disease, and consisted of "destruction of the cortex on both sides corresponding to the region in which the auditory projection fibres terminate, viz., posterior one third of first temporal convolution, transverse gyri of Heschl, and posterior part of second temporal convolution." In addition to these there was a third area of softening corresponding to the distribution of the left anterior cerebral artery, and accounting for the paralysis of the right leg.

In this case, therefore, the first lesion (affecting the left auditory centre) produced temporary *word*-deafness and sensory aphasia, the second lesion (affecting the right auditory centre) resulted in complete and permanent deafness.

(2) Boenninghaus' case. A man, aged forty-five, suffered from an apoplectic seizure producing complete left-sided paralysis and anaesthesia. The paralysis passed off almost entirely in a few days, but some of the anaesthesia was permanent. The damage was in the right internal capsule, and the right acoustic tract must have been permanently destroyed, but it was doubtful how far the destruction extended towards the cortex of the temporal lobe. Five years later another seizure occurred, unaccompanied by loss of consciousness or paralysis of the limbs, which resulted in complete deafness and loss of speech. After a few weeks the speech returned and gradually improved until he could be understood, but pronounced some words wrongly and substituted wrong syllables. He read in a similar way, but wrote almost correctly and copied quite correctly. Two months after the attack some degree of hearing returned, so that finally he could hear fairly loud noises—with the right ear rather better than the left. Tested with the tone series he could hear upper tones with both ears, but with the right ear nothing below *H* and with the left nothing below *a*³. The tympanic membranes were normal. In spite of hearing sounds, and even loud conversation voice, he could understand nothing. All sounds seemed to him the same indistinguishable noise, and he could not even tell the number of syllables in a word. The condition was, therefore, one of sensory aphasia with paraphasia, and was the result of damage to the sensory speech centre, shown by Wernicke to be situated in the left first temporal convolution. The second lesion must have been cortical, because a part of the sensory speech centre escaped, but it must have been sub-cortical also, because the path from the speech centre to the ear was broken.

(3) Case of Kahler and Pick. A woman, aged forty-two, as a result of two apoplectic seizures separated by an interval of a few

years, lost her understanding for sounds of all kinds, although deafness was not complete. The autopsy disclosed softening of all the temporal convolutions except the basilar on both sides of the brain.

(4) C. K. Mills' case. A woman, aged forty-six, after an attack of apoplexy, became paraphasic and word-deaf but not paralysed. After the attack she could hear sounds, but could not understand either words or music. Six years later another attack was followed by total deafness and left hemiplegia. At the autopsy, destruction was found on the left side of the posterior two thirds of the first and posterior quarter of the second temporal convolution, and on the right side of both first and second temporal convolutions.

(5) Case of Wernicke and Friedländer. A woman, aged forty-three, had an attack of apoplexy resulting in right hemiplegia with aphasia and inability to understand speech, but not deafness. Three months later a second attack produced slight paresis of the left arm and absolute deafness. At the autopsy, destruction was found on the left side of the posterior half of the first and second temporal convolutions and a small part of the third; on the right side of the angular gyrus and the posterior part of the first temporal convolution.

(6) Pick's case. The patient was a man, aged twenty-four, who at the time of examination was completely word-deaf and behaved like a deaf person, but could hear loud sounds. A lesion on the right side of the brain had occurred ten years before, followed four years later by damage on the left side which had resulted in complete word-deafness and great loss of hearing. The autopsy showed destruction on the left side of the posterior half of the first temporal and of the supra-marginal gyrus, and on the right side of the whole of the first and most of the second temporal convolutions.

To these six cases of this remarkable condition I am now able to add the seventh. The patient, a man, aged thirty-two, was referred to me in September, 1914, by Dr. Carlisle, of Heswall, on account of complete deafness following an apoplectic attack in the early part of the previous year. The history, for which I am largely indebted to the kindness of Dr. Warrington, who examined him on several occasions during the period of his illness, was as follows: At the end of December, 1912, he was seized with sudden, violent pain at the back of his head, which was followed in a week by aphasia and verbal amnesia. This had cleared off

by the end of another week, but three days later right ptosis was noticed and on the next day right hemiplegia. The condition improved rapidly under treatment by mercury, but on February 17, 1913, he was attacked with sudden pain in the right side of his head, followed on the next day by left hemiplegia, blindness, and deafness. His mental condition was much affected; he would not talk, and tried repeatedly to get out of bed. The paralysis and loss of vision rapidly disappeared, and, except for slight facial palsy, were absent a fortnight after this attack. His general condition was then good and he talked freely, but there was still some paraphasia, and his understanding of written language was limited to simple sentences. He remained completely deaf. Apart from the deafness, which did not alter, he subsequently made a complete recovery, and with the exception of a seizure in November, 1913, in which he became speechless for twenty minutes, he has remained in perfect health ever since.

Both Dr. Warrington and other neurologists who examined him agreed that he had suffered from a bilateral cortical lesion, resulting in damage to both temporal lobes and destruction of the auditory centre on both sides of the brain.

When I examined him on September 24, 1914, about one year and nine months after the first attack, he was actively engaged in business and was apparently a normal person in every respect, both physically and mentally, with the exception that he was totally deaf in both ears.

The tympanic membranes were normal, but no trace of hearing even for loud noises or for any tone, either by air or bone conduction, could be detected. That the deafness was not due to any lesion of the labyrinth or eighth nerve was rendered practically certain by the fact that, while the cochlear function was entirely abolished, the vestibular reactions were normal. I do not find this observation recorded in connection with any of the other cases of cerebral deafness, but I think it may be said that when complete or extreme loss of bone conduction is associated with normal vestibular reactions the presumption that the deafness is of central origin is at least very strong.

As the patient is still alive this case, like that reported by Boemminghaus, lacks the anatomical proof which an autopsy alone can give, but that they are both examples of bilateral damage to the auditory centre, and therefore on a par with the other reported cases which were examined after death, can scarcely be doubted. Perhaps the most remarkable feature of the case I have put on

record—a feature in which it differs from all others previously reported—is the association of complete and permanent deafness with perfect recovery of all other functions.

From the otologist's point of view these cases of bilateral lesions are of interest as affording proof of the representation of each auditory organ on both sides of the brain. Destruction of one cortical centre for hearing causes deafness of neither ear, although, if a portion of the *left* temporal lobe be destroyed, *word*-deafness may result.

That the eighth nerve, in man at least, crosses incompletely, like the second, and sends fibres to both auditory centres, is proved also by the fact that from the ventral acoustic nucleus of each side fibres can be traced to the upper olive of both sides and thence to the corresponding corpora quadrigemina, internal capsules, and temporal lobes.

On the other hand, in the dog, some experiments carried out by Munk appeared to show that the crossing is complete, as he found that destruction of the right temporal lobe and right labyrinth caused total deafness, whereas if the crossing had been partial, as in man, the dog should still have heard with the left ear. In the year 1886 Kaufmann reported the case of a woman, aged seventy-nine, in whom a sudden left hemiplegia was accompanied by total deafness of the left ear. The autopsy showed destruction of a large part of the right temporal lobe, and the case is put on record as one of crossed cerebral deafness. Owing, however, to the absence of precise details as to the condition of the ears both before and after the occurrence of the brain lesion, this case cannot by itself be regarded as of much value in face of the other clinical and histological evidence to the contrary, all of which tends to show that in man the crossing of the eighth nerve is a partial one.

It is to be noticed that the nerve tract connecting the ear and auditory centre of the same side is much smaller than the tract connecting the ear of one side with the opposite centre, and it might be expected that destruction of one centre would result in appreciable loss of hearing of the opposite ear. In none of the cases, however, do accurate tests appear to have been carried out during the interval between the occurrence of the two cerebral lesions. This question must therefore remain in doubt for the present.

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WHAT FACTOR DETERMINES THE EAR TO BE THE FIRST ATTACKED IN CHRONIC MIDDLE-EAR CATARRH?

BY MACLEOD YEARSLEY, F.R.C.S.,
 Senior Surgeon to the Royal Ear Hospital, etc.

IN nearly every case of chronic middle-ear catarrh it is usual to find that the condition was originally unilateral. In a certain number this unilaterality appears to be due directly to causes operating in the nose or naso-pharynx on the same side, but in some cases it is noteworthy that the ear first attacked is on the side opposite to the nasal lesion. Naturally there must be some reason for this fact, and I believe the explanation is to be found in the side upon which the patient rests during sleep. I have recently, therefore, made inquiries of patients in order to ascertain whether my surmise is correct, and I have obtained striking confirmation from the twenty cases investigated to date. These will be found tabulated below.

The majority of cases of chronic middle-ear catarrh owe their origin to the irritating effect upon the naso-pharynx of the secretions from an ill-drained nose, due to septal deflections and spurs and enlarged posterior ends of inferior turbinates. Such irritation is enhanced at night by the effect of gravity in the recumbent position, and, if the head be usually inclined to one side during sleep, secretions in the naso-pharynx would naturally gravitate to that side and the lower Eustachian orifice would be bathed in them more or less continuously. This very simple explanation would appear to account satisfactorily for the fact that one ear is attacked before the other.

It will be noticed from the table that out of twenty cases the right ear was attacked in fourteen. In these the nasal lesion was on the right in six, the left in three, and indeterminate in five. But in no less than thirteen the patients stated that they were in

the habit of sleeping on the right side. The fourteenth (No. XIX) had marked right nasal stenosis.

In six cases the first ear attacked was the left, and in these the nasal lesion was on the opposite side in three cases, on the same side in two, and indeterminate in one. Inquiry of these patients elicited the fact that all of them slept on the left side.

Of course, twenty cases is a small number upon which to base results, but the facts shown are sufficiently striking to merit publication. I shall continue to investigate, and perhaps other otologists will assist me in confirming or refuting my suggestion.

It would appear that the majority of people sleep upon the right side for the greater part of the night; probably because in this position the stomach empties itself more easily. One patient, suffering from an acute right median otitis (not included in the twenty) due to acute naso-pharyngeal catarrh, informed me that he invariably slept until six o'clock on the right side, then changing to the left.

Case No.	Ear first attacked.	Nasal abnormality.	Side usually slept upon.
I	R.	R. deflection	R.
II	L.	R. posterior spur and deflection	L.
III	R.	R. spur	R.
IV	R.	Irregular septum	R.
V	R.	L. spur	R.
VI	R.	L. posterior spur	R.
VII	R.	Posterior ends	R.
VIII	R.	L. deflection	R.
IX	L.	R. deflection	L.
X	L.	L. posterior spur	L.
XI	L.	Irregular septum	L.
XII	R.	R. deflection	R.
XIII	R.	R. deflection	R.
XIV	L.	R. spur	L.
XV	R.	Symmetrical inferior spurs	R.
XVI	R.	R. deflection	R.
XVII	R.	Irregular septum	R.
XVIII	R.	Irregular septum	R.
XIX	R.	R. spur and R. middle turbinal	L.
XX	L.	L. deflection	L.

SOCIETIES' PROCEEDINGS.

PROCEEDINGS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

Held in Atlantic City, New Jersey, May 25-27, 1914.

Address of the President: The Air we breathe.—Thomas Hubbard (Toledo).—During the period 1825 to 1875 the standard of temperature of dwellings and public places was gradually increased from 55° F. to 72° F. There was no attempt at corresponding increase of humidity: 55° F. with natural ventilation implies about 40° relative humidity; 72° F. gives a natural humidity of 20 per cent. or lower. From the health point of view the 20 per cent. decrease in humidity is more important than the 15 degrees rise of temperature.

Catarrhal and acute infections are more prevalent during the cold months to a degree not creditable. Abnormal dryness of the air of our habitation is a factor worthy of attention. Dry air is dust-laden air—and an infection disseminator. Moist air causes precipitation of dust content, and a proper humidity lessens dangers of air-borne infections.

The caloric shock of sudden change from 70° F. and 20 per cent. relative humidity to outdoor air 30° F. and 80 per cent. relative humidity (average winter condition) causes chronic congestion and inflammatory reaction in air-passages. Chronic pathological changes in mucosa and turbinates follow. Unhealthful atmosphere of our habitations is the ever present aetiological factor in winter catarrh.

The difficulty of humidification lies in the high temperature standard. It is almost impossible to moisten air up to 50 per cent. relative humidity and at the same time ventilate. The problem is simplified at 65° F. with 40 per cent. relative humidity: 65° F. with 40 per cent. relative humidity feels as comfortable as 72° F. with minus 20 per cent. relative humidity. 65° F. is the "critical point" in heating air. Fuel cost increases very rapidly above that. There is a positive natural resistance above 65°. To heat air from 60° to 70° F. costs as much in fuel as to heat it from 20° to 60° F.

65° F. is the natural temperature standard for habitations. In so far as we are habituated to a temperature above that, we are that much hypersensitised to temperature, and consequently more subject to caloric shock; and, further, health and economy unite in demanding a revision of heat standard downward, in order that a healthful humidity standard, 40 to 50 per cent., may be made practical.

Ventilation is important, but there is such a thing as too much ventilation. When air of desiccating, unhealthful quality is introduced in volume sufficient to change the air of a building two to four times an hour (the minimum rate to get proper distribution of heat), it is virtually a dry kiln effect, and the more rapid the change the lower the humidity. For example: Furnace heated school rooms are gradually brought down to considerably below 20 degrees relative humidity (14 per cent. in one test), and no amount of so-called "fresh-air" without artificial addition of moisture can offset the deleterious effect of the abnormal dryness.

The average winter relative humidity of the North Atlantic and Middle States is near 80 per cent. This condition makes it all the more important that we give special attention to "conditioning" the air we breathe up to a tonic healthful degree of humidity.

Engineers and architects are prepared to meet any reasonable demand, and it is our duty to aid in educating toward establishing proper heat and humidity standards.

Dr. JOSEPH H. BRYAN (Washington): Physicians postpone taking up this very interesting subject, contenting themselves with treating the pathological conditions that take place in the upper air-passages resulting from vitiated air, rather than educating their patients how to live in an atmosphere that is not only comfortable but healthful. He agreed as regards the temperature of our living rooms; 65° seemed to him the maximum—anything above that increased the sensitiveness of the individual. It was notorious that Americans indulged in too much heat in their homes. The only other nation that lives in such hot houses is the Russian. Foreigners coming to America to live for the first time almost universally complain of the great heat of our houses. Humidity and temperature are so intimately connected that they cannot be considered separately. As Dr. Hubbard said, a temperature of 65° with a humidity of 40 per cent. will be as comfortable as a temperature of 72° with a humidity of 20 per cent. These are simply opinions, and must be verified by more extensive observations before they can be accepted as a standard for the sanitary engineers to go upon in supplying our homes and public halls with the proper atmosphere. How are we to arrive at the proper conditioning of the air we breathe so as to produce an atmosphere that is conducive to health? It can only be done by the medical profession joining forces with the sanitary engineer. The engineer is prepared by the many devices at his command to produce any kind of air that is desired. He, however, has not been able to bring about the desired results because there is no uniformity of opinion in the medical profession as to what kind of air is best for the health of the individual. We have been too slow to take up and investigate this most important subject. When this is done and a uniform opinion formed, there then remains for us the all important duty of educating our patients how to live in a healthful atmosphere.

Dr. JOHN F. BARNHILL (Indianapolis) said all had seen cases which cannot endure a temperature below 70° without great distress. These cases had been, in his practice, usually those of ethmoiditis; when they go into a lower temperature and are inactive they will have fits of sneezing, watery discharge, discomfort, cold feet, and distress in general. For a long time he thought there was something psychic about it, and tried to dissuade them from their feeling that high temperature was the proper thing. About two years ago he began to have the same condition himself. When he would sit in a room less than 70° he began to sneeze and had discomfort. He could not sleep in a room where the temperature was less than 65° without waking in the morning with great distress. On examination by a rhinologist small polypi and a beginning ethmoiditis were found and when these were cured he could again live in a lower temperature without discomfort.

Dr. HENRY L. SWAIN (New Haven) did not understand which method was recommended for bringing up the humidity of any given house or room to a desirable state. It must be that if we are stimulating the physiological functioning of our nasal mucosa from both outside and inside, moistening the air to our lungs, we are making a physical stimulus

sufficient to produce or to intensify a tendency to hypertrophy in such a nose.

Dr. CHARLES W. RICHARDSON (Washington) had, some years ago, talked to the chief of the Weather Bureau, and he raised the question of increasing the humidity and lowering the temperature as being the most comfortable for living purposes. He explained it so thoroughly and satisfactorily that ever since then he had kept his waiting room uniformly at 60° with 40 per cent. humidity. But most of his patients speak of the coldness of his hands. His patients also complained about the coldness of the rooms.

Dr. THOMAS HUBBARD (Toledo), in reply, said that in regard to Dr. Bryan's conclusions that 40 per cent. to 60 per cent. relative humidity is the healthful standard, most engineers believed that anything above 50 per cent. was impracticable, especially with regard to the question of condensation of moisture on windows and in cold weather the frosting, which must be taken into consideration. It should also be mentioned that when the occupants are undergoing physical exercise they can stand only from 45 to 50 per cent.; when engaged in a sedentary occupation they can stand more. The discomfort of foreigners is really due to the change in humidity, not to the temperature. He emphasised the indirect system of ventilation as largely responsible for the changes in the humidity: the colder the weather the less moisture in the atmosphere or fresh air you take into the furnace, and the more rapid the change in the air of the house the more rapid is the lowering of the standard of humidity. The modern system is a combination of direct and indirect—direct for the heat of the room and indirect for a moderately rapid change of air or temperature of the room. With reference to Dr. Richardson's statements he considered that 60° was too radical a change for most of us, because we are so accustomed to 70°, even with a humidity of 50 per cent. Ultimately we will regard 60° as a standard to be obtained, just as now we consider 65°, but at present it is too sudden a drop for most people from 70° to 60°, and there would be more or less positive physical discomfort.

Primary Lupus of the Larynx.—**Emil Mayer** (New York City).—Three cases of lupus of the larynx, two of them primary, had been under the writer's care during the past year. As he had presented this same subject seventeen years previously to this Association, opportunity was afforded for a comparison with the viewpoint then existing, as also of noting the progress made in the diagnosis and treatment of this affection.

The total number of cases of primary lupus of the larynx recorded in the literature up to the present time, including the two here presented, was thirty-five, indicating the rarity of this affection, which was first described by Ziemssen in 1876. It was perhaps noteworthy that the two cases presented by the writer in his former communication were of primary lupus of the larynx in their earliest stages, and were observed for many years; while the two here presented were in the later stage of the disease. Lupus of the larynx is a chronic disease with but the slightest symptoms, it is often accidentally discovered, and the prognosis as to life is relatively good.

The distinctive appellation of lupus should be maintained; primary lupus of the larynx, though rare, does exist.

Dr. J. PAYSON CLARK (Boston): A case I saw recently is very interesting—that of a young woman, aged twenty-four, who was sent to me by a skin specialist. She first discovered, somewhat over a year ago, a small

red spot on the left cheek, just about the angle of the mouth; she showed it to local physician, who made light of it, so she forgot it; but last fall it had increased somewhat in size, so she went to a dermatologist. He was not able to make a diagnosis, but kept it under observation until early in February, when he decided it was lupus. Then a little later she was a little hoarse, and he thought there might be some lupus of the throat, so sent her to me. I discovered on the left side of the posterior wall of the pharynx, and involving the left posterior pillar, a pale nodular mass, which had all the typical appearances of lupus. On examination of the larynx I found the epiglottis swollen, pale, and nodular, and this same condition extended down to the aryepiglottic fold, and the arytenoids were somewhat enlarged. This patient was apparently in perfect health, well developed, of splendid colour: lungs examined and gave no sign of any trouble. What am I going to do with this case? Of course, if this condition existed only in the spot in the pharynx, I could curette it and cauterise it thoroughly, but I do not feel that by removing the epiglottis I will cure the trouble, because if you see an epiglottis infiltrated in that manner, you will know that the process microscopically has probably extended considerably further, and if you remove the epiglottis you will have no surety of removing the whole disease. Probably the aryepiglottis and arytenoids are also affected.

Dr. WILLIAM E. CASSELBERRY (Chicago): I was about to ask Dr. Mayer if he would not, in closing the discussion, go a little more into detail with respect to the first case. I do not doubt the correctness of his diagnosis, but I feel I would have made a mistake and called this tuberculosis of the larynx. In a man with advanced pulmonary tuberculosis, with cavities, etc., and with enlargement of the larynx and nodular enlargement of the epiglottis, even though not associated with much pain, I am sure that I have seen just such cases in both advanced and incipient tuberculosis, which I have included in my cases of tuberculosis of the larynx. I know that there is a clinical distinction between lupus and tuberculosis, both with respect to the skin and the mucous membrane, and I do not doubt that we can have the two conditions combined, just as Dr. Mayer has led us to infer was the case in his patient.

Dr. HENRY L. SWAIN (New Haven): I would like to ask Dr. Mayer what has been the result, in these cases, of tuberculin used along modern methods, as in cases of tuberculous laryngitis? In speaking of the marked benefits from superheated air does he use suspension laryngoscopy?

Dr. BIRKETT (Montreal): Some years ago I reported before this Association a case of primary lupus of the pharynx, and at the same time mentioned a case of lupus of the nose which was found only accidentally to have involved the larynx. These conditions were definitely found to be lupus; first, from the presence of the bacillus, secondly, from the local definite reactions to tuberculin, and finally, from the transmission of the disease to guinea-pigs. The lungs in both cases were absolutely negative, for the use of tuberculin would have awakened any latent focus had any existed. The treatment instigated in both cases was the X-ray. In spite of the local treatment which I had carried out it had resisted treatment until X-rays were used, which was accomplished by means of a lead tube dropped into the pharynx and down to the larynx, allowing of direct application. Both cases got absolutely well. Recently, within the past six months, I have seen two cases of primary lupus of the nose, both of which have made complete recoveries under radium. In one case the specimen was definitely pronounced by the pathologist to be carcinoma; this was very curious, for two specimens were sent to the patho-

logist at different times, without his knowing they came from the same patient, and he returned the same diagnosis for each. The physician in charge of the X-ray department, Dr. Perry, pronounced them locally to be cases of lupus.

Dr. EMIL MAYER, in reply, regarding the diagnosis in the first case: The man was brought to me by his physician, who was a very good observer, with the very thoroughly elicited history of having a complaint of only seven weeks' duration. His story was that over four years ago he had a cough, for which he was treated, and then remained well, and yet at the time of examination there was this tremendous infiltration and destruction in his larynx: a condition which must have been of very long duration and for which this man had absolutely no complaint. It seemed to me from the nodular excrescences, the absence of all previous bad conditions, together with the absence of dysphagia and its slow progress, for it was only discovered when the tuberculosis of the lung had become apparent, because the man had been in such surroundings that his history would have been brought out quite early if he had anything of the sort, that it was entirely proper to place this case solely in the catalogue of late appearance of lupus of the larynx, beginning there and eventuating in the lung. And as the second case was without lung involvement, and no great infiltration and destruction had occurred, I felt justified in putting both in the same category. It is possible that this is one of the cases we meet when we investigate cases of arrested tuberculosis. The point has been brought out by Dr. Birkett and Dr. Clark, that lupus of the larynx is an accidental discovery. As regards tuberculin treatment, it has been used extensively, particularly by Blumenfeld, Edmund Meyer, and others, and they extol it very much, used carefully and in the manner indicated. The old tuberculin is used in all instances, the new tuberculin not being used because of the danger of oedema. Superheated air is claimed to have good results by laryngo-fissure, and it was one of the methods of treatment which was suggested, using the Killian suspension apparatus. As regards the helplessness of our treatment, it does seem rather peculiar to speak of the treatment of a disease of slow progress which causes the patient little or no discomfort. As regards any treatment which is instituted—and we may have to go from X-ray, radium, superheated air to this new method of Pfannenstiel, of the direct effect of iodine—the whole endeavour should be to inhibit as far as possible the insidious progress of this disease.

Primary Sarcoma of the Trachea.—J. M. Ingersoll (Cleveland).

—A case of sarcoma of the trachea in a man, aged thirty-two. The patient had a persistent, troublesome cough for several months, and during this time he had had three very severe prolonged attacks of paroxysmal coughing. In each of the attacks he had finally coughed up and expectorated what he called a "polyp." He corroborated this statement by showing me the polypi which he had expectorated. They were irregular, slightly nodular masses. The smallest one was about 1.5 cm. in diameter, and the largest one was 3 cm. long and 1 cm. thick, tapering down to a small pedicle at one end. The larynx was inflamed, and on the left side of the trachea, just below the first ring, there was a pedunculated tumour, quite similar in appearance to the largest one which the patient had expectorated. At this same time there was no indications of any involvement of the tissue around the larynx and trachea. Microscopic examination showed the tumours to be spindle-celled sarcoma. External operation was refused at the time by the patient, and later, when he con-

sented, the growth had already extended beyond the larynx and was inoperable. Thirteen weeks later the patient died: no autopsy was permitted.

Dr. D. BRYSON DELAVAN (New York City): The question of malignant disease of the trachea is especially interesting because of its hopelessness. I have seen a number of cases of malignant disease and of non-malignant growths of the larynx treated by means of radium in the hands of at least one of the most expert users of radium in the world, and he found it extremely difficult to make the proper exposures of the radium to the growth. If that be the case in the larynx, the difficulties in the trachea are increased, even though the applications be made through an incision in the trachea. The use of the X-ray, while palliative and beneficial to a certain extent, we admit is powerless to cure certain types of growth.

Dr. CHEVALIER JACKSON (Pittsburg) could recall but a single case, and even here he was not sure it was primary in the trachea. He had seen a large number of cases of malignant disease of the trachea, but always as an extension. There was one case where he felt justified in considering it primary. He also agreed with Dr. Delavan in the hopeless outlook. He could not imagine the possibility of the cure of even a very small primary malignancy in the trachea, when we consider the fact that it occurs, as Dr. Ingersoll said, on the posterior wall, which is full of lymphatics, and the lymphatic leakage is extremely prompt. It is a very different situation anatomically from a small intrinsic malignancy located in the larynx. When it gets to the posterior wall in the larynx it is truly hopeless of cure because of the lymphatic leakage. He questioned whether radium could accomplish much in malignancy in this position. He had seen it used with remarkable results in sarcoma of the larynx, which nearly a year later developed an unquestioned squamous-celled epithelioma on the site of the cured sarcoma. Was this a coincidence or due to the use of radium?

Dr. JOHN M. INGERSOLL: I have found as yet nothing which offers as much hope of recovery as an early operation if the condition can be got before it has extended beyond the trachea: in such instances it seems to me the hope of possible recovery is something like, but not as good as, in intrinsic malignancy of the larynx.

Horse Asthma and Allied Conditions.—J. L. Goodale (Boston).—Dr. GOODALE reviewed briefly the literature relating to anaphylactic reactions following the administration of antitoxic sera, and reported a series of cases of vasomotor disturbances of the upper air-passages, which were examined in regard to their reactions following the local application of horse serum to the abraded skin and the nasal mucous membrane.

In five patients with horse asthma, the application of horse serum to an abrasion of the skin produced within a few minutes sharply localised cedema and reddening. In three of these cases the introduction of horse serum in the nose caused cedema of the nasal mucous membrane, together with profuse watery discharge and sneezing. One case of horse fever without asthma gave a delayed reaction to the nasal test, but was negative for the skin test. A similar case gave a delayed but definite reaction to the skin test, but showed no nasal symptoms. Four of the horse fever cases without asthma were negative for both tests. In two cases the sister who had horse asthma reacted markedly to both tests, while the brother, whose vasomotor symptoms from horses affected the nose alone, showed no reaction. Six cases of bronchial asthma and five cases of hay

fever were negative for both tests. Three cases without vasomotor symptoms, which had received immunising doses of antitoxin several months previously, showed no reaction to the tests.

The results of these experiments indicate that a localised anaphylactic reaction from horse serum may be occasioned in certain individuals who experience asthmatic disturbances from the neighbourhood of horses. The severity of these vasomotor symptoms appears to be a determining factor in the production of the reaction, since persons with nasal symptoms alone do not appear to be sufficiently sensitised to horses to give a positive skin test.

The suggestion was made that a preliminary skin test with horse serum be made in all patients who have previously received an injection of antitoxin derived from horses, whether tetanus, diphtheria, or plague serum. Furthermore, in all patients who are about to receive antitoxin for the first time, inquiry should be made as to whether they have ever been disturbed by asthmatic symptoms when in the neighbourhood of horses, and if so they should first be tested.

So far as these experiments go, they would indicate that in horse asthma a dangerous anaphylactic shock may occur after the hypodermic administration of horse serum. In horse fever with nasal symptoms alone, this danger is less or not at all to be feared, and in other types of asthma and of vasomotor rhinitis it is not present.

Dr. BURT R. SHURLY (Detroit): Dr. Vaughan has certainly elaborated one of the most scientific and most practical theories in regard to sensitisation and anaphylaxis that has yet been brought before the scientific world, and the remarkable point of it all is that by injecting ordinary egg albumin solution in repeated doses the guinea-pig dies in all the phases of severe surgical shock. And the point which was not brought out in the paper is that it is exceedingly dangerous to inject any antitoxin after the ninth or tenth day from the initial dose. It was my pleasure many years ago to do the experimental work on the diphtheria antitoxins which were brought out by a large manufacturing house before they were put on the market, and we had occasion in a large diphtheria service for the first time to observe the very varying effects of antitoxin upon patients, and the very great difference in these effects according to the manufactured product. The product of some laboratories is exceedingly high in cutaneous reaction, erythema, urticaria, and these manifestations of anaphylaxis vary according to the method of manufacture. So that, of course, the modern methods have greatly eliminated the dangers of sensitisation where the reaction is decidedly less. Those of us who have met with an example of what it means to see a death in three to five minutes after the injection of antitoxin certainly carry with us through life a most profound feeling of the very great danger which antitoxin may manifest, and yet in an enormous experience in our own city we have had but one fatal case after antitoxin administration. This was in a man, aged forty-five, whom I was called upon to do a tracheotomy for, but who had the anaphylactic symptoms inside of three minutes; in about five minutes he was dead. There was no history obtainable of a previous dose of antitoxin having been administered. But the very great danger comes in administering a dose after the ninth day; and it seems we have certain definite lessons to learn in the fact that we use horse serum to control hæmorrhage, and we use the various kinds of antitoxin in our special line of work, and we should have these definite things well in mind. For some reason, sensitisation increases in a most marvellous way after the ninth or tenth day, and you will

remember that the cutaneous eruption which occurs after antitoxin is almost always to be found on the ninth day. Therefore, whenever I give diphtheria antitoxin to anybody, I always tell them not to be afraid of developing scarlet fever or measles should this rash appear, as it probably will, on the ninth day. Another very definite thing which we should always have in mind before administering an antitoxin is to inquire if the patient is asthmatic or already using antitoxin. Again, the use of the adrenalin glands are undoubtedly very greatly the source of many of these disturbances of sensitisation, as shown by Šajous in his elaborate scientific investigations.

Dr. HANAU W. LOEB (St. Louis): I should like to mention an experience which I once saw which brought this matter of sensitisation before my mind most convincingly. I could understand how, if an animal was sensitised to any agent, being again injected he would die, but in Dunbar's laboratory he made another experiment which was far more convincing. The sensitised animal died in three or four minutes; then he took the urine of that animal and injected it into an unsensitised animal, and that one died in a shorter time, showing the production of a deadly poisonous substance produced in but a few minutes.

Dr. J. PAYSON CLARK (Boston): I had the good fortune to run across what to me was a most marked case of horse asthma in a young man, aged nineteen, who said that he had had asthma from the age of three to ten years, and was cured by going to the southern pines, and then by an osteopath. Also, when he was a child he could not eat eggs without a sense of constriction in throat and blotches on his skin. For three or four years now, since he was fifteen years of age, he can eat eggs, but if he eats them raw he has a gagging sensation in his throat. As long as he can remember he has been very sensitive to a horse or cat. Riding behind a horse brings on an asthma, for which he has to go to bed—oppression in the chest, and all the symptoms of a severe asthmatic attack; at the same time he has sneezing and a watery discharge. The cat causes only nasal symptoms. On examination, I found the septum deviated and the right and lower turbinates swollen, mucous membrane bathed in watery secretion. I thought I would try Dr. Goodale's skin reaction; I did not get it, whether due to my faulty technique or not, I do not know. Then I thought I would try by hypodermic doses of horse serum, beginning with a minute dose. I prepared a solution by mixing the horse serum with normal salt solution, into which I put .05 per cent. of phenol; on the first day I also applied some adrenalin to his nose to see what the reaction would be, and gave him a spray of camphor, menthol, and albolol. On May 1 gave him 1:1000 of 1 c.c., with no reaction; on May 2 1:1000 of 1 c.c., with no reaction. I then intended to increase the dose to 1:10 of 1 c.c., then to 1 c.c., in successive days, until I obtained a reaction. I then gave him one-fifth of 1 per cent. solution to use in his nose as a spray. He had been completely incapacitated for work because any dust made him sneeze. His father telephoned to me the day before I left Boston to attend this meeting that his son did not sneeze at all any more, and considered himself cured, and was going to take a position the following day.

Dr. HENRY L. SWAIN (New Haven): I have seen one patient so near death this winter that I tremble to think how close to the brink he was. Now, if from such work as Dr. Goodale presents there is a method which we will be able to use as a test, we are certainly adding to the list of possibilities when the need of antitoxin comes up. Is there any reaction in normal subjects?

Dr. WILLIAM E. CASSELBERRY (Chicago): In Dr. Goodale's report he differentiates horse asthma from the general asthma class: the horse asthma patients will react to the serum, and these patients are subject to immunisation by means of the serum. We find many of our patients are a mixed form, suffering from horse asthma as well as other asthmas. In connection with Dr. Goodale's patient, who was an equestrienne and who reacted so favourably to the immunisation with the horse serum, did she have asthma in other directions, and did this other asthma show equal immunisation?

Dr. GEORGE E. SHAMBAUGH: I would call attention to anaphylactic reactions following the eating of certain fruits. I remember the case in my own family of an individual who had the phenomenon that her eyes would swell and the œdema would extend to the conjunctiva, and was associated with some sneezing. She at times had had slight asthma. We did not know what the condition was caused by, and yet I have seen several cases where œdema of the larynx had followed the eating of grape fruit. When I noticed that, I observed in my own family that whenever grape fruit was eaten by this individual it would produce œdema of the eyes, and so this fruit was cut out of her diet, and the phenomenon disappeared: it has now been some time since she has had such an attack, and, strange to say, she can now eat grape fruit with impunity. I saw a case in the last few years where the patient had frequent attacks during the winter of anaphylaxis, with very pronounced swelling of the eyes, puffiness of the face, coryza, and discomfort. I never had a chance to see her during the attack. I examined her very carefully, and there was what seemed to me some evidence of hypertrophic ethmoiditis on one side: the symptoms were so annoying to her that I removed the anterior part of the middle turbinate to give her relief. The phenomenon continued at intervals: it apparently came on as a bacterial infection, and I was convinced later that it came from the tonsils, which I removed a year ago, and she has had no attack since. If I may judge from the results, the infection took place in the crypts of the tonsils, starting an anaphylactic reaction.

Dr. JOSEPH L. GOODALE, Boston (in closing): There is no reaction in normal patients. There were three subjects having antitoxin last October in a small epidemic, and the death of one of the boys brought this matter to my attention. The cases which had had previous antitoxin, especially cases of horse fevers, showed no reaction. In the first place, the one case of mild horse asthma with fever complained of a lot of sneezing and a little constriction, and developed the reaction forty-five minutes after the dose. So that we have very marked differences in the promptness with which these reactions appear. With regard to Dr. Shurly's statement, that the ninth day is the one when skin reactions are usually found, I find this varies markedly. The von Pirquet has shown this difference in rapidity of reactions after a full dose. They may appear in a few minutes, in a few days, and the ninth day is usually the crisis at which the accomplishment of the storing of the zymogen reaches its maximum. Replying to Dr. Casselberry's query, my first patient lives on a farm, which she manages, and it is, therefore, a little difficult to separate the influence of horses from other influences. But I believe there are two types of asthma in this case, because I have on occasion made her leave the vicinity of the horses, during which times she was greatly improved; nevertheless, she still had some asthmatic symptoms. Since the removal of her tonsils four years ago she had been freer from continuous asthma, and the type is not simultaneous with increase in the

œdema of the ethmoid, but with the neighbourhood of horses. It seems actually now as though she would have more comfort this summer than ever before.

Environmental Surgery of Otolaryngology.—**John F. Barnhill** (Indianapolis).—In the early history of the practice of otolaryngology the field was a very limited one. The belief seems to have been that the nostrils constituted the nose, the tympanic cavity and Eustachian tube the ear, and the structures outside the larynx were not included in the domain of laryngology.

As knowledge concerning the accessory sinuses of the nose and ear, and of the lymphatic system, the cranial nerves and their ganglia accumulated, the field of work of the specialist of this class of necessity widened until at present any limitation which does not include the diseases of the entire head and neck would be unwise. That the entire field of the surgery of the head and neck lies within the domain of the otolaryngologist should now be conceded by all. It is not advocated, however, that all who limit their practice to diseases of the ear, nose, and throat should undertake the many difficult and often capital operations necessary about the head and neck. Only a small percentage, perhaps, would feel sufficiently qualified to do so. It is advocated, therefore, that a cleavage in the ranks should take place, and that those who are not surgically inclined, and those whose surgical opportunities have been small, should limit their work to the therapeutic and local treatment of nasal and aural diseases, while those whose opportunities in surgery have been ample, and who are willing to devote their entire time to anatomic study and surgical progress, should undertake the difficult surgical problems of the upper air tract and its entire environment. Such an arrangement would be best for the patient, because it would save him from operation by those often little qualified to do surgery. It would insure better therapeutic measures on the part of those whose practice is not burdened by important surgical cases, it would free the real surgeon from the burdens of a large routine office grind, and would thus enable him to devote his entire time to the surgery of the most complicated region of the body.

Dr. D. BRYSON DELAVAN (New York City): This is a burning subject, and has been one ever since the surgery of the larynx came into vogue. It bears out my own experience and that of all other laryngologists who have had to deal with operative laryngeal cases. The wife of a prominent officer, a lady in early middle life, had a little papillomatous growth which Dr. Knight and I observed for two years, after which time she developed symptoms of malignancy, was operated on by most expert operator, in one of the first hospitals in the city. No one could take the slightest exception to the operation, but the surgeon left this patient in the hands of an inexperienced nurse, who had never seen such a case before, and the patient died. Another patient of mine had exactly the same experience, and so on through a long list of harrowing accidents of all kinds. The suggestions in this paper meet with my approval, as I believe they are very valuable. There are two kinds of specialists as well as two kinds of surgeons. One kind is the therapist, whose strength lies in the medical side of laryngology, and the other kind is the natural born surgeon. It should not take long for one to discover on which side lies his forte.

Dr. J. SOLIS-COHEN (Philadelphia): One case occurred in my own practice which I have never published, and one very similar to that mentioned by Dr. Delavan. As all the people connected with it are now dead,

I will relate it. I performed a laryngectomy, leaving the wings of the thyroid cartilage, taking out simply the interior, by a method which I devised at that time. I performed the operation and I had, as I thought, a good assistant at the hospital. I lived only three or four squares from the hospital, and at twelve o'clock that night it seemed to me I must go to the hospital and see what was the matter with that patient. I went and found the male nurse asleep on the floor beside the patient; the resident physician had told me he would stay up with the patient all night himself, and would let me know if I were needed. Then I went into that resident's room and found him in bed asleep. And if I had not been at that moment by his side, that patient would have suffocated from trouble with his tube. Another case occurred somewhat like that, and I felt a desire to go to the hospital, and when I reached the bedside I found the man struggling with a trained nurse who was trying to put in the tube upside down, strangling the man before my very eyes. Ever since then I have stayed by my patient for twenty-four hours. There are more patients lost by the after-treatment in laryngectomies than by the improper performance of the operation.

DR. HENRY L. SWAIN (New Haven): When we consider that Gluck, who was the pioneer in doing complete laryngectomy, has performed his last sixty-one operations without a single operative death, it proves that the general surgeon, when he learns how, can do the work pretty well. When you take a man who does a thyrotomy and scoops out the growth without rhyme or reason, we understand why it is desirable for the laryngologist to be present. In other words, we who are interested and know the anatomy of the parts are better qualified to advise the general surgeon, and should at least be on hand to lend assistance and advice when such operations are being performed on our patients. This is equally true in removal of the hypophysis. If the surgeon wants to do the external surgery, all right, but we could do the operation as well or better.

DR. JOHN F. BARNHILL (Indianapolis), in closing: I agree with what has been said. I think, however, it was not understood that I feel, as do some others, that laryngologists and otologists should do neck and head surgery in general. How often it is that we remove a tonsil and we find that the child or adult has a large number of decaying lymphatics that must come out; it seems that we should be able to undertake this work and not have to call someone else to do it. I believe the patient would stand a better chance of good recovery, and we would have a better interest, and that by proper and sufficient training we should be prepared for this work even better than is the general surgeon of to-day.

Laryngocele Ventricularis.—George E. Shambaugh (Chicago).—This name was applied by Virchow to a condition which he had found *post mortem*, consisting of an elongation of the ventricle of Morgagni, extending as far as the upper border of the thyroid cartilage and occasionally to the hyoid bone. This condition is now believed to be a normal anatomical variation. The term "laryngocele ventricularis," as here used, applies to a cystic dilatation of the ventricle of Morgagni, a pathological condition which results from forcible distension with air of the ventricle, usually as the result of coughing spells or the use of wind instruments. It is probable that as a predisposing factor an elongated appendix of the ventricle must be present. Cases occur where there is only an intralaryngeal distension, others with only extra-laryngeal distension, where the cyst has broken through the thyro-hyoid membrane, producing a

swelling in the neck, and in other cases where there exists both an intra- and an extra-laryngeal distension.

The case here reported occurred three years ago, in a woman, aged sixty-nine, and developed in the course of a violent coughing spell. There was a distension in the neck, the size of a hen's egg, and an intra-laryngeal swelling which filled at least two-thirds of the space in the larynx. About a year after the development of the laryngocele the condition became infected, and the most annoying symptom since then has been the discharge of quantities of foul-smelling pus into the larynx: as much as a quarter of a tumblerful can be expelled at one time by pressure over the external swelling. The case has been greatly improved by an external operation, in which the cyst in the neck has been removed down to the opening of the thyro-hyoid membrane. The intra-laryngeal condition has been operated upon by slitting the cyst from below upwards with a hooked knife. There is still present an enlargement in the larynx which causes some annoyance, especially from the discharge.

Dr. E. FLETCHER INGALS (Chicago): I had a similar case without infection. I treated it by aspirating the cyst, and then injecting it with equal parts of 95 per cent. carbolic acid and glycerin. At any rate, I got an excellent result at that time. But he came back to me within the past month, and the cyst is now altogether intra-laryngeal, as large as a filbert, and I must do the same thing over again.

Abstracts.

PHARYNX AND NASO-PHARYNX.

Professor Gerber (Koenigsberg).—Tumours of the Hypopharynx. "Zeitschrift für Laryngologie," Band vi, Heft 5.

If the pharynx and oesophagus formed a continuous wide tube, as the older text-books showed, there would be little difficulty in the recognition and treatment of pathological conditions of the hypopharynx. As a matter of fact, the posterior part of the cricoid cartilage is so firmly applied to cervical spine that we have a water-tight and air-tight closure which only yields on swallowing or the application of force. Formerly pathologists always spoke of affections of the oesophagus when they referred to the hypopharynx. Case 1: Male, aged seventy, had suffered for five weeks from hoarseness and dyspnoea, but not from dysphagia. On examination, the right half of the larynx was fixed, the right false cord was greatly thickened and covered the true cord, and the swelling also involved the arytaenoid and pyriform sinus. The left ventricular band was also swollen and hard, but there was no ulceration. A piece of the swelling was removed and microscopically examined, but showed only evidence of inflammatory and hyalin change. Suspension laryngoscopy was carried out and another portion of the swelling removed; this was followed by hæmorrhage, and intubation was necessary. Later, tracheotomy had to be performed, but in spite of this the patient died. The *post mortem* showed an ulcer in the right pyriform sinus which communicated with the larynx. The ulcer was typically epitheliomatous. Case 2: Male, aged thirty-eight, complained of something sticking in his throat, since he had swallowed a fish-bone. The patient, however, had no difficulty in swallowing, but complained of dyspnoea and retching at

night if he lay on his left side. The case had been regarded as one of neurasthenia by many physicians and specialists, some of whom said it was due to deviation of the nasal septum and others to enlarged lingual papillæ. Operation on these conditions had been recommended. On examination, the larynx was normal, but, when the patient was asked to retch up the tumour, he obliged by doing so. The tumour turned out to be a polyp the size of one's little finger and appeared between the tongue and the soft palate on the left side. In another moment the tumour had disappeared again. With the aid of hypopharyngoscopy, the tumour was removed with the cold snare. Its site of origin was the lateral wall of the pharynx behind the posterior pillar.

Gerber remarks that the complete absence of dysphagia in the first case was very astonishing. In the second case, which appears to be unique, the polypus was a continuation downwards of the salpingopharyngeal fold. In its upper part the polypus had an intramural course, but the lower end lay in the hypopharynx behind the cricoid. The growth was over four inches long. Gerber remarks that if the surgeons who had missed the condition had used hypopharyngoscopy, they would have recognised this "flesh and blood" globus hystericus. It appears that tumours of the pyriform sinus give rise to almost no symptoms. Gerber explains this by the fact that these sinuses are always open. He has made horizontal sections through the hardened hypopharynx which appear to prove his contention.

J. S. Fraser.

Schulz, Adolf (Danzig).—The Treatment of Naso-Pharyngeal Fibroma in Young People. "Zeitschrift für Laryngologie," Band vi, Heft 6.

Schulz thinks that naso-pharyngeal fibroma is intimately connected with the growth of the base of the skull, and that, in some cases, when this ceases, the tumour disappears spontaneously. The tumours are simple, and danger only arises from hæmorrhage and from interference with the supply of food and air. Schulz records the case of a male, aged seventeen, who appeared pale and cachectic. A large ulcerated tumour was present, and the patient's breath was foul. Microscopic examination was to the effect that the condition was one of fibro-sarcoma. Several operations were performed with the galvano-caustic snare under local anaesthesia, but the tumour recurred in six months and was again dealt with. At the time of publication—three and a half years after the last operation—the patient was free from recurrence. A second similar case is recorded. Schulz is of opinion that endo-pharyngeal operation alone is necessary and favours the use of the galvano-caustic snare, or the Vulpis burner, under local anaesthesia, so as to avoid the danger of inhalation pneumonia.

J. S. Fraser.

Richardson, J. J.—A Study of Vincent's Angina. "Annals of Otology, etc.," xxiii, 335.

Vincent's angina is the local manifestation in the throat and mouth of a disease caused by the fusiform bacillus and the spirillum having Vincent's name, probably the same organism in different phases of existence. It frequently occurs after measles, scarlatina, diphtheria, pertussis, etc. It is more serious as a secondary infection than when occurring primarily. It is more common in malnourished and children and adult males. Primary infection is probably preventable by proper care of mouth, teeth, and general health. It is more common than is

supposed and is contagious on close contact. Usually acute, it may be chronic, and recurrence is not uncommon. The tonsil is, as a rule, the point of attack. It usually lasts but a few days, but may run into weeks and months. Symptoms are chiefly local. The organisms are anaerobic, and proper diagnosis depends on a smear. Treatment is principally local. Trichloroacetic acid, chromic acid, and salvarsan give the quickest and best results.

Macleod Yearsley.

NOSE.

Zemann, W.—Bilateral Submucous Resection of the Lateral Nasal Wall and Removal of a large Foreign Body by this Route from the Maxillary Antrum. "Zeitschrift für Laryngologie," Band vi, Heft 6.

The author remarks that the foreign bodies in the maxillary antrum seldom enter by the natural ostia and are usually introduced by artificial openings. They consist of drainage tubes, cotton wool, broken instruments, etc. Broken and diseased teeth are not infrequently forced into the antrum. Sterile and non-irritating bodies may remain a long time in the antrum without causing symptoms, and a case of antral suppuration has recovered in spite of the presence of a drainage tube in the cavity. Small bodies may be felt by the patient to move about in the antrum, while a sudden stoppage of the flow of fluid during lavage may indicate a foreign body. It may also be due to swelling of the mucous membrane. The usual method of removal is by the Caldwell-Luc operation. Zemann's patient was a soldier, who stated that he had fallen and received a wound under the right eye. This wound continued to suppurate externally, and in addition blood-stained discharge came from the nose. On examination no pus was seen in the middle meatus, but a radiogram showed a foreign body in the antrum, while on proof puncture purulent fluid returned through the external fistula, *but not by the nose*. The operation was as follows, under local anaesthesia, the anterior third of the middle turbinal was removed. ? Inferior turbinal. An incision was now made in a horizontal direction as far forward as the pyriform aperture. A vertical cut was now made at the anterior end of the first incision and the inner wall of the antrum submucously resected. Part of the antral mucous membrane was next removed and the foreign body extracted. This proved to be a bullet weighing 13 grms, and the patient confessed that the injury had been due to the explosion of a weapon which he had himself manufactured.

J. S. Fraser.

Sippel, Otto (Wurzburg).—Choanal Polypi. "Zeitschrift für Laryngologie," Band vi, Heft 5.

Choanal polypi occupy a position between ordinary nasal polypi and typical naso-pharyngeal polypi. Cyst formation is common in naso-pharyngeal polypi, which were formerly said to arise from the outer boundary of the choanæ. In 1905 Killian pointed out that they really came from the maxillary antrum, emerging through an accessory ostium. He also held that they might originate in the posterior ethmoidal or sphenoidal sinuses. The polypi may emerge during the act of sneezing. They grow quickly on account of stasis due to partial strangulation. [The abstracter is of opinion that, if the mucosa of the antrum be polypoid, the act of hawking may suck out a piece of the polypoid

tissue through an accessory ostium.] Lang holds that choanal polypi only occasionally come from the antrum (one in six). In other cases they originate from the middle meatus or posterior end of the middle turbinal. Lang made use of antroscopy to diagnose the site of origin. Killian's observation has, however, been confirmed by Kubo and a host of other observers. Sippel records two cases in which the patient suffered from cough on going to bed. This symptom was due to the tumour touching the posterior wall of the pharynx. Sippel records seven further cases: (1) The polypus originated from the middle turbinal and was removed with the snare. (2) Similar (the results obtained from transillumination and X-rays are not stated, and the cases are not reported at a sufficiently long time after operation to be of great value). (3) Origin from septum. (4) Antral case: removal with the snare; cure after some days. (5) Origin from pterygoid fossa: this polypus is said to have had two stalks. The left ethmoid was cloudy and was cleared out. (6) Origin from middle turbinal. (7) Apparently from sphenoid. On going over the literature Sippel finds that the site of origin of choanal polypi is as follows: Nasal cavity, twenty-five cases; accessory sinuses, fifty-nine cases (maxillary antrum in fifty). Sippel suggests that cases should be classified into primary and secondary—the former coming from the choanal margins and the latter being subdivided into antro-choanal, speno-choanal, etc. *J. S. Fraser.*

Müller, J. (Nuernberg).—Gangrene of the Nose and other severe Results of a Diagnostic Tuberculin Test. "Zeitschrift für Laryngologie," Band vi, Heft 5.

Müller's case was that of a male, aged fifteen, who had suffered from enlarged glands in early youth. These had been excised. Moro's test was markedly positive, and microscopic examination showed caseated tubercle. Again in the same year glands had to be excised. In the following year (1912) a von Pirquet reaction was performed by a doctor who did not know about the microscopic examination of the glands. A subcutaneous injection was performed at the same time—one drop of a per cent. solution of old tuberculin being employed. (There seems to have been some doubt as to the strength of the solution, and a later investigation showed that the solution was only 1 in 1000.) Twenty-four hours after the injection the patient vomited and suffered from diarrhœa and fever. The face became livid, and the neck, lips, eyelids, and nose swelled up. An eruption appeared on the back, and the mental faculties were dulled. The site of the von Pirquet reaction healed well, while that of the injection became red and swollen, and covered with small punctiform hæmorrhages. The right knee showed a bluish-green area, the size of a five shilling piece, and a black blister appeared on one of the toes, from which a stinking hæmorrhagic and purulent exudate was evacuated. The pharynx and tonsils became inflamed, but the lungs, heart, abdominal organs, and urine remained normal. Under treatment by ointment, powders, etc., the skin lesions healed, and the patient eventually made a good recovery. Müller states that the opinion now usually held is that severe tuberculin reactions, dangerous to life, do not occur. But after his experience of the present case Müller is against intracutaneous injection, though he admits that the patient got a dose either five or fifty times as large as was necessary. Müller thinks that the case was one of focal reaction, and that, at the affected spots, small foci of tuberculosis were present. According to the author, the only other possible explanation is to be found in anaphylaxis. Müller has seen similar cutaneous

hæmorrhages in a case of severe antipyrin anaphylaxis. He admits, however, that the cardinal symptoms of anaphylactic shock—lowering of blood pressure, leucopenia, lowered clotting power of the blood, etc.—were not present when the patient was admitted to the clinique.

J. S. Fraser.

Gerhardt (Würzburg).—Serous Meningitis in Diseases of the Nose.
“Zeitschrift für Laryngologie,” Band vi, Heft 5.

Quinke, in 1893, first drew attention to this condition, which not infrequently follows injuries to the head and otitis media, but is rarely the result of disease of the nose and accessory sinuses. Gerber, Reipen, Onodi, and Wendel have, however, recorded cases of nasal origin. Gerhardt's cases are as follows: (1) Female, aged fifteen, had complained for a year of sudden attacks in the street, during which everything appeared black. There was no giddiness. The vision of the left eye had been diminished for six months, but there was no headache. Choked disc with early atrophy were noted, and there was some limitation of the field of vision. The ears were normal and the Wassermann reaction negative. After many visits to the nasal clinique, a little pus was discovered in the ethmoidal cells. The cerebro-spinal fluid was under increased pressure, but contained only a trace of albumen and no globulin. Treatment consisted of rest in bed and repeated lumbar puncture. The sight of the right eye became normal. (2) Male, aged nineteen, had complained of morning vomiting for two weeks, also of pain in the stomach and head, constipation, and cough. The pulse varied from 64 to 76. There was slight right facial paresis, and Babinski's sign was present. Choked disc on both sides. Wassermann reaction negative. Kernig present. Cerebro spinal fluid under pressure but otherwise not pathological. An intravenous injection of collargol was given and quinine and pyramidon administered by the mouth. Two months after admission pus was discovered in the left ethmoidal region, and the bulla was found to be bulging. The mucous membrane of the ethmoidal region was polypoid. Three weeks later the headache improved. (3) Male, aged eleven, had an injury to the head four years ago. This was followed by headache. A second head injury resulted in giddiness, tinnitus, double vision, and twitching of the left side. Two weeks later, another injury to the head was followed by recurrence of all the former symptoms, along with diminution of the vision of the right eye and slight deafness in the right ear. On admission, the right disc was choked and the left one slightly affected. On X-ray examination, the right ethmoidal region was cloudy, and pus appeared on the application of suction. The condition cleared up without operation. (4) Female, aged sixteen, suffered from *anæmia* and had had frontal headache for two months. Cerebro-spinal fluid was under increased pressure. There was a little dry pus in the posterior part of the right nose, and the posterior end of the right middle turbinal was removed, without the discovery of any sinus suppuration. The headache, however, disappeared. Gerhardt remarks that probably all headaches are due to increased pressure of the cerebro-spinal fluid. He thinks that the first two cases are clear, but admits that in Case 3 the traumatism and in Case 4 the *anæmia* might give rise to headache. The exact pathology of serous meningitis is not known, but the possibilities are: (1) penetration of organisms and (2) collateral œdema. Gerhardt thinks we must assume in these cases that disturbance of the paths of absorption of the cerebro-spinal fluid, *i. e.* the

cerebral sinuses, Pacchionian bodies, arachnoid veins and lymph channels, and the nerve sheaths. For rhinologists the conclusion is comforting, *i. e.*, local operative treatment is important in cases of acute or chronic serous meningitis. The nasal condition may be only a slight mucous catarrh, which may only be discovered after minute investigation. Gerhardt thinks that probably many idiopathic and influenzal cases of serous meningitis are not recognised as being due to nasal conditions. [It might probably be as correct to state that intra-nasal treatment accompanied by blood-letting may lower the tension of the cerebro-spinal fluid, and so remove headache at least for the time.—*Abstracter.*]

J. S. Fraser.

LARYNX.

Sheldon, J. H.—Note on a Case of Congenital Laryngeal Stridor. "Lancet," November 14, 1914, p. 1147.

A Madrassee male infant, aged five months. Born at eighth month and hand-fed from birth. The chief features of the case were: (1) Stridor present from birth; (2) transverse furrowing of the lower chest-wall; (3) certain auscultatory signs (division of inspiratory murmur during stridor into two, sometimes three, separate sounds); (4) absence of cyanosis; (5) absence of laryngeal excursion; (6) a heart-rate uninfluenced by respiratory movements; and (7) excellent health of the child. The stridor was inspiratory and always present, both sleeping and waking, save for short periods of half an hour during sleep and whilst taking the bottle.

Macleod Yearsley.

EAR.

Barnhill, J. F.—Two Cases of Sarcoma of the Dura Mater arising in the Vicinity of the Mastoid Process, with vague Symptoms simulating Mastoiditis. Operation in each Case followed by ultimate Death. "Annals of Otology," xxiii, 381.

The somewhat long title explains the paper. The patients were: female, aged thirty-six, and male, aged twenty-eight. The writer can only find one very similar case reported (by Glegau, *Annals of Otology*, xx, 428).

Macleod Yearsley.

MISCELLANEOUS.

Perutz and Sippel (Würzburg).—Chemio-Therapy of Skin Tuberculosis by the Intravenous Infusion of Gold Potassium Cyanate, with special reference to Lupus of the Mucous Membrane. "Zeitschrift für Laryngologie," Band vi, Heft 6.

Herxheimer and Altmann have treated twelve cases of lupus with a combination of salvarsan and old tuberculin, with success. Finkler and von Linden have used hydrochlorate and hydriodate of methylene blue, chloride of copper, and also a combination of copper and lecithin. These preparations can be given internally, subcutaneously, or by intramuscular or intravenous injection. Of late gold salts have been employed, especially gold potassium cyanate. Bruck and Glück treated twelve cases intra-

venously with this remedy. Some of the patients got tuberculin as well. In Seifert's Clinique at Würzburg, eighteen cases of lupus of the skin and mucous membrane have been treated with gold potassium cyanate alone, since January, 1913. Perutz and Sippel began with 0.07, and had no bad local results as regards the vein injected, and only two cases of infiltration. The injections, however, were often followed by a rise of temperature. One patient, who had already had two injections, soon after the third complained of giddiness and fainted. Later, the patient suffered from spasms, sweating, and vomiting. The writers state that gold is supposed to have a great effect in preventing the development of the tubercle bacillus. The writers, however, found that gold potassium cyanate did little good, and they appear to have carried out the treatment very thoroughly. Four cases had only one series of injections, six cases had two series, and two cases had three series. The writers state that fresh nodules appear soon after the treatment, and think that the remedy seems to "mobilise" the tubercle bacillus. They do not think that in gold we have found the wished-for chemio-therapeutic remedy for tuberculosis.

J. S. Fraser.

Turner, Logan, and Fraser, J. S.—Direct Laryngoscopy, Tracheo-bronchoscopy, and Œsophagoscopy. "Edin. Med. Journ.," January and February, 1913.

In this paper the authors give a clear account of the indications, the technique, the difficulties, and dangers, etc., of the direct method of examination of the upper air-passages and œsophagus. Several illustrations help to make the description clearer, and a number of cases are reported.

Arthur J. Hutchison.

REVIEW.

The Origin and Nature of Stammering.

Stammering and Cognate Defects of Speech. By C. S. BLUEMEL. Two volumes. New York: G. E. Stechert and Co. London, Leipzig, Paris. 1903.

As everybody knows, most books on stammering, voice-production, and similar topics are, like the diadactic novel, written "with a purpose." That we should thus compare them with, say, "The Sorrows of Werther," or "The Sorrows of Satan" (we name these in their chronological order), seems a little unfair to Werther and to Satan, neither of whom, if their biographers are to be relied upon, either stammered or required lessons in voice-production. But the fact is that in both of these classes of literature, the author is getting at us, although, to be sure, it may not be until the last line of the last page has been reached that the uneasy suspicion begins to dawn upon our minds that things are not what they seem, and that we have been done.

Sometimes, it is true, the suspicion never dawns. In which case, to continue to metaphor, we remain enveloped in the darkness of ingenuousness, and the author has laboured in vain.

When, however, the suspicion does dawn, then works on stammering and voice-production join those masterpieces of Goethe and Marie Corelli, than which no fate more gloomy can be imagined.

One or two, by reason of their honesty escape the holocaust, and Mr. Bluemel's is one of these brands. Here the sounds of the big drum, of the grinding axe, and of the blowing horn, are quite inaudible, and all we get is a well-reasoned, rather long-drawn-out attempt to prove that stammering is due to a defective memory for vowel sounds—in the first volume; while in the second volume the many systems of treating the disorder are carefully described and caustically criticised.

In other words, this is a book to be taken seriously; the which we now proceed to do.

Mr. Bluemel believes, as we have just said, that stammering is due to a defective auditory memory for vowel sounds. To quote his own words, the essential nature of stammering is "a transient auditory amnesia," "the stammerer's difficulty manifesting itself on that part of the word that cannot be readily pronounced kinæsthetically, *i. e.*, on the vowel." "When the auditory image" in the mind "is definite and tangible he can more readily recall it." Hence he stammers little on long vowels and rarely hesitates in singing.

That the essential defect consists in a delayed enunciation of the vowel sounds has long been accepted as correct. But Mr. Bluemel's theory that this disability arises from a fugitive amnesia of the vowel sound seems to be new. It is new to the reviewer at all events.

The author adduces a long array of arguments in support of his thesis, which he believes to be capable of accounting for all the phenomena manifested by the stammerer, and it must be acknowledged that the case he makes out seems at first sight to be quite a strong one. But, unfortunately, he does not base his theory upon the solid rock of a large number of examinations and records to show that stammerers actually are deficient in their appreciation and recollection of vowel sounds. That being so, we cannot regard his doctrine as anything more than a theoretical explanation, and as such it is open to criticism of a theoretical character. From this standpoint we are bound to declare that the author has not succeeded in convincing us that he is on the right lines.

We have already observed that Mr. Bluemel's theory is an amplification and development of the old view which threw the blame for stammering upon an inability to produce vowel sounds promptly. Consequently, if we can show the older theory to be untenable, then Mr. Bluemel's must likewise go by the board.

It is with no little diffidence that we proceed to do so, as the vowel sound theory has been gratefully accepted as the solution of the problem by many writers since Arnott first hatched it out in 1827.

In spite of this imposing antiquity, however, and no less imposing authority, it is really difficult to treat the old theory with the respect due to its standing: principally because of the fact that many stammerers stammer both upon vowels and upon consonants. Thus, at the very outset of our examination of this view we stumble upon a difficulty to all appearance insuperable.

If a man stammers upon consonants the reason he does so may certainly be because he is uncertain or incapable for the time being of pronouncing the following vowel sound (when, *e. g.*, he tries to say "tin" he may linger on the "t" because the "i" sound escapes him). But, if that be the case, then, equally, when he stammers upon a vowel the reason must likewise be because he is unable for the time being to pronounce the following consonant (when, *e. g.*, he tries to say "old" and repeats "o—o—o—o" before producing the "d," on the same reasoning, the delay must be due to the "d" sound having escaped him).

That looks very like common-sense to be sure.

But the vowel-sound theorists are superior to common-sense; they say, in effect: when a man stammers on a consonant he does so because he is weak in pronouncing vowel sounds; when, on the other hand, he stammers on a vowel that does not mean that he is weak in producing consonants, it still means that his difficulty lies with the vowel sounds.

There is a further objection. In addition to the fact that many stammerers reduplicate vowels as well as consonants, there is a common type of stammerer who does not break up his words at all, but who interpolates habitually a sound like "eh-eh-eh" between whole words. Besides that, there is another type—the silent stammer—in which an aphasic pause lasting a few seconds is interposed before, or intervenes in the midst of, an otherwise perfectly continuous flow of words. Obviously those three types, the vowel stammer, the interpolated stammer, and the silent stammer, cannot all be explained by the vowel-sound theory.

They therefore must be due to some other defect. Now, as far as we know, nobody has ever proposed a division of stammerers into several separate classes, each of them due to a different cause. Consequently, the vowel-sound theory fails to cover all the facts and ought on that account to be abandoned.

Recurring for a moment to the undeniable fact that most stammerers stutter more over consonants than they do over vowels, we should be inclined to say that the proper method of posing the problem would be, of course, not to ask why consonants are *exclusively* selected for stuttering over, but why they are *preferably* selected. A very different matter this!

We shall have a shot at replying to this question later on.

Apart from such considerations and objections, however, which may seem to some people to be merely a matter of logic-chopping, and going to the root of the business, it appears to us that the fundamental weakness both of the Arnott theory and of Mr. Bluemel's modification of it is that they obviously depend upon an analysis of what happens to an individual word when a stammerer tries to pronounce it. This, we submit, is a faulty method of observation, because it places the point of view much too close to the object, with the result that we cannot see the wood for the trees.

As a matter of fact, save in the case of interjections, which, however, play a considerable part in ordinary conversation, nobody in speaking emits isolated words as if he were ejecting peas. Accordingly, in an investigation of the stammerer's defect, what we ought to do is to regard his whole habit of life and conversation. We ought to be in a position to make a large number of observations upon stammerers unaware, for your stammerer is a shy bird. One must live with the stammerer, in short. While we say that, however, we should like at the same time to utter a word of caution against accepting as authoritative the subjective analysis by the stammerer of his own defect. Mr. Bluemel will remember what the late William James was fond of calling "the psychologist's fallacy."

Relying, then, upon such general and comprehensive observations of normal and of stammering speech, we venture to make the following remarks.

Ordinary adult conversational speech, apart from interjections and exclamations, is enunciated in groups, or, as it were, in waves of words—in phrases, that is, and even in complete sentences. It is a current, short or long, of variable volume and of variable wave-length and height, accord-

ing to the nature of the contained ideas. In each wave or impulse an idea-group of words is poured out from the higher speech-centres upon the lower co-ordinating and motor centres for arrangement and distribution among the many muscles of expiration, phonation, and articulation, from the diaphragm to the lips.

The method of utterance of each group will be influenced by the length, volume, and intensity of the initial and subsequent impulses, and these, in turn, will vary with the ever-shifting shades of meaning and feeling in the speaker's mind. The rhythm and emphasis of speech quite obviously reflect, the one, the more dominant and fundamental, the other, the more transient and flickering ideas—using the term *idea* in its wide significance as including a thought together with its emotional colour.

Regarded in this light, speech is produced by the outpouring of a series of nerve-impulses issuing from the fountain-head somewhat jerkily and irregularly, and transformed into a more even current by subordinate and semi-independent nerve-centres as it is broken up and distributed at the various cell-stations. It is, I suppose, impossible to do more than to guess at the situation and number of the tiers of neurones concerned in the transmutation of an idea into muscular movement and physical vibration. But in any case it is not necessary for our present purposes that we should know these details. For, plainly, the harmonious working of this machinery may be interrupted or brought to a standstill by one of two factors at least, each of them being, however, but a different aspect of one and the same phenomenon.

First of all, an excess of emotion may produce a discharge explosive in its violence, too great, too sudden, and too rapid for the lower neurones, especially if they are unprepared, to arrange for and to distribute. In which case the very volume and intensity of the nerve-current leads to its blockage, just as water under high pressure, a stop-cock being suddenly opened, may momentarily pause and "stammer" as it issues from the pipe. Such excesses of emotion cause stammering in perfectly normal people. We are "speechless with fear," or "choked with rage," and so on.

The second factor by which the mechanism of flowing speech may be disturbed and the current interrupted is weakness, either by bad training (habit) or by disease, of the co-ordinating and distributing centres. In this case stammering will often occur, and that even when discharge from the higher centres is quite moderate in volume and in strength. It is this which, in my opinion, produces habitual stammering.

In other words, the cause of stammering, whether occasional or habitual, is a relative weakness of the co-ordinating mechanism of speech. Either the discharge from above is too violent, or the lower centres are defective. In both cases they are incapable of dealing with the flow.

This view, for which no novelty is claimed, locates the defect in the motor and not in the sensory organisation of the brain. It explains, as we shall see in a moment, all the varieties of stammering, and it does not necessitate the assumption of a far-fetched hypothesis before it can be imagined as possible.

As to the nature of the defect in the co-ordinating areas we have a suggestion to offer, but it will be more convenient to postpone its appearance until a later section.

In support of the view thus outlined, the following considerations may be offered.

If a stammerer be carefully watched, it will be seen that his defect is most troublesome at certain periods in his speech. First of all, the beginning of a phrase or a sentence, whether the first word begins with a con-

sonant or whether it begins with a vowel, presents an obvious difficulty to him—that is to say, at the moment when the impulse from the higher centres first reaches the lower neurones. That obstacle successfully cleared, a flow, or rather a burst of speech ensues, in the course of which, however, the stammer again intervenes, and this time a particular word constitutes the obstacle. That passed in turn, a further run of speech follows evenly and smoothly until he has to start a fresh sentence, and so on, each stammer marking, as it were, the arrival or the culmination of a wave of impulses from the higher centres.

It is everywhere acknowledged that stammerers are at their worst when charged high with emotion. Wyllie, by the way, points out in his "Disorders of Speech" that, as a rule, stammerers are people with an unstable and easily excited nervous system. Here we get a hint of the close relationship which lies between stammering and the emotions. We have already alluded to this circumstance, and proceed now to enlarge upon it.

We have said that the rhythm or cadence of normal speech reflects the deep-swelling movement of the more dominant and fundamental emotions of the speaker's personality. In saying so, we do not mean to assert that in our everyday talk and conversation we lisp in numbers or chatter in poetical measures. But we do say that there is evident even in the casual commonplace talk of ordinary men a segment of a curve of feeling whose beginning and end lie hidden beneath the surface. When our interest in a subject under discussion is only lukewarm, this speech rhythm is low and slow and little evident, and under such conditions even a bad stammerer will hesitate but little in his utterances. When, however, we become intrigued in a subject and our talk becomes more animated, then the rhythm swells and shortens. At this point the stammerer begins to manifest definite interruptions in his conversational flow. When, finally, we are agitated, the speech rhythm assumes a broken and irregular character, and in this choppy sea of the emotions the stammerer halts and jerks and stutters to such a degree that he may be unable to utter a single word.

In addition to the general influence of deep emotion we find also that emphasis is a source of difficulty to the stammerer. Normally, in even speech we naturally emphasise the more important words: a substantive, for example, receives more stress than its preposition. This slightly greater prominence is sufficient to render these words a stumbling-block to the stammerer. In this case, however, if the general level of feeling is low the stammer will be relatively slight, unless there is some inherent quality in the word itself which renders it difficult. Besides the emphasis naturally placed upon grammatically important words, it often happens that we intentionally lay stress upon particular words or phrases. Much of our meaning is conveyed by this kind of emphasis and intonation. ("It wasn't *what* she said, but *the way she said it*.") This voluntary effort to lay weight upon certain phrases and words almost always trips up the stammerer, independent of the construction of the words themselves. Thus, in the sentence "He gave me five pounds,"—after the preliminary stammer a break will occur upon that one of the following words upon which the high relative value in the speaker's mind necessitates its being uttered emphatically.

We have repeatedly alluded to the fact that some words constitute in themselves and apart from their meaning a special difficulty to the stammerer, and we have seen that most stammerers stutter more over consonants than they do over vowels. The consonants which generally

prove to be most troublesome are the explosives (b, t, d, etc.), and the words which are most likely to lead to a halt are those which begin with one of these consonants. We have now to discuss the reason for this selection. Stated baldly, the reason, it seems to me, lies simply in this, that when the flow of speech is obstructed the motor neurones go on repeating the consonant because it is easier for the halting speech to hang on to a consonant than on to a vowel sound.

Kinæsthesia is the sensation of movement. Without going into an unsettled question in psychology we may nevertheless say that in the case of the explosive consonants the sensations of these letters when they are pronounced, inasmuch as they originate in the highly sensitive lips and tip of the tongue, must be much more definite and tangible than the sensations produced by vowels when they are spoken. Hence the stammering motor neurones tend naturally to repeat the consonant rather than the vowel sound, and the explosives rather than the other consonants until the interruption to further progress is overcome or eluded. Kinæsthetically, a vowel is less easily enunciated than a consonant, says Mr. Bluemel, and here we are at one with him. But we part company with him when we say that it is because of their high kinæsthetic value that certain words come to present almost an insurmountable barrier to some stammerers.

At this point we may allude to the method of treating stammering which was introduced by Erasmus Darwin a century ago; a method which is still popular. This teaches the stammerer when uttering words beginning with a consonant to elide or depress the initial letter of the word, and to start off with the vowel. Curiously enough the vowel-sound theorists seem to claim the occasional success of this method as a support of their views. But, surely, if the vowel sound constituted the chief difficulty then all efforts to pronounce such words by dragging the difficulty forward would only make the stammering worse!

With our theory, on the other hand, the success of Darwin's method is explicable, since what the elision of the first letter of a word does is to modify and graduate the abruptness of the impulse as it falls upon the lower motor centres. By insinuating the word in, so to speak, coaxes the weak co-ordinating centres to enter upon their task. If this reasoning be correct we should expect Darwin's method to be applicable to all words indifferently, whether they commence with a consonant or with a vowel.

We have now seen that stammering habitually tends to affect, first, the preliminary syllable or word of a phrase or sentence; secondly, grammatically important and emphatic words; and thirdly, certain special words. (If two or all of those features are present at one time the stammering is naturally very much increased.) We have also seen that the defect is exaggerated or minimised temporarily according to emotional circumstances. And we have endeavoured to show how all these phenomena may be accounted for on the assumption of some weakness in the motor mechanism of speech. We shall now widen the range of our inquiries in order to obtain, if we can, additional support for the theory we are advocating.

First of all we turn to the evolution of speech in childhood. Many little children pass through a stammering stage when they are learning to speak; that is to say, at the time when the co-ordinating centres are in process of being educated. We hasten to add that there are many children who never enter this stage, and that most of those who do enter it pass through it and leave it behind them. But the stammerer never gets out of it. So that stammering may be regarded as the perpetuation of a developmental phase, comparable to many of the developmental de-

formities in the physical framework. Stammering is thus incompletely formed speech.

Now if an innate defect like an auditory amnesia were the cause of stammering, children who had once stammered would go on stammering to the end of their days, for the memory of sounds, if it is an inborn faculty, like the ear for music and the eye for colour, must be incapable of any very marked improvement by education.

There is another fact which is strongly suggestive of stammering being due to some motor defect produced by education and habit, and that is that stammering is contagious. If a child becomes a persistent and habitual stammerer, other children who are intimately associated with him tend also to develop the habit.

Again, there is a point which many of the writers on stammering seem to have overlooked, and that is that the disorder is not a singular and isolated phenomena in nature. It possesses, indeed, as we shall see when we come to consider the matter, many relatives in other regions of motor activity.

A sort of stammering in writing is by no means uncommon. Everybody has seen the writer who cannot begin a letter, a sentence, a phrase, or even his own signature, without first of all performing a series of vague whirls and flourishes in the air with his pen before putting it to paper.

The swinging hesitation in "addressing the ball" at golf, although, to be sure, it is stereotyped and taught as the regulation stroke, is perhaps in origin another instance of the same thing. Its general prevalence does not weaken our argument: it only shows that we are all stammerers where golf is concerned.

The whole psychological picture of stammering, whatever be the motor areas affected, closely resembles, as Mr. Bluemel justly points out, stage fright and its congeners: the trembling anticipation of any critical event wherein we expect to be prominent figures, such as marriage, battle, and major surgical operations, particularly if it is our first engagement.

At all such crises a period of hesitation and timidity precedes the plunge into the whirlpool of events. The will is paralysed, and for a moment the whole personality stammers. But the hesitation is fleeting in normally constituted people. And, according to the classical opinion, it is actually due to the piling-up of accumulations of nerve-energy in the great neurone areas against the large and sudden withdrawal or discharge which is expected to follow and for which preparation is thus being made. The batteries being over-charged their outflow is impeded, just as a mass of people in trying to crowd through one small door constitutes its own obstacle, or as logs jam on a Canadian lumber river.

The state is seen to perfection in the nervous prancing, backing, and rearing of a fresh young horse. In some horses this becomes a habit, and they are then the victims of the incurable vice known as "jibbing." Those horses are like the worst kind of human speech stammerers in that both have frequently to abandon all hope of progress for the time being.

Thus speech stammering is, in reality, but one variety of a large and widely distributed group of nervous phenomena, which, in the present state of our knowledge may be most safely assumed to be due to insufficiently independent and imperfectly subordinated, and so weak nerve-centres in the areas which receive, sort out, and dispatch impulses of a motor nature.

In the various types we have mentioned the reader cannot but be struck with one feature that is common to all. This characteristic is the

oscillation of impulse and discharge; the hesitation; the going on and the coming off; and it inevitably suggests a fluttering block in the emission of impulses. The block we have hitherto expressed in terms of physics, likening it to the stammer of a water-pipe; to the crowding of individuals at a narrow door, and so on. But in describing nervous phenomena such physical analogies must not be pushed too far, and the question arises whether such effects could not be produced by operations of nerve-tissue of a kind familiar to us in the physiology of nervous action. We think that they could be so produced.

The mechanism of co-ordination consists of motor impulses alternating and combined in due order with inhibitory impulses, both co-operating to produce an even and regular succession of definite movements directed towards some definite end. That being so, the most probable cause of an interruption of the kind we are discussing would be some excessive inhibitory influence powerful enough to hold up all advance for the time being.

If now we take a further step into the region of hypothesis, and assume that an excess of inhibition can be automatically evoked by any motor impulse above a certain intensity, it is thereby possible to account for the occurrence of physiological stammering in all its different forms.

Further, if we assume that by ill-training the inhibitory centres become over-sensitive, or irritable, so that they respond to motor impulses of a perfectly normal intensity; or, what amounts to the same thing, that the subsidiary motor centres are insufficiently educated to ignore this interference, then we have a nervous functional disorder which would lead to habitual or pathological stammering.

Apart from such a refinement, however, the foregoing summary clearly indicates that the flaw which is responsible for stammering is to be found in the motor co-ordinating centres.

The surprising fact that there is, as a rule, little or no stammer present when a stammerer is singing, reciting, or reading aloud, is probably due to a combination of favourable circumstances. To begin with, the peculiar and often distracting excitement which fills the mind when it is engaged in independent action is then absent. Secondly, the stammerer being led by the hand, so to speak, all doubt and hesitation are banished. Thirdly, the cadence or rhythm of the speech is already fixed. In a word, the mental processes are almost purely automatic and native emotion or excitement is reduced to a minimum.

At the end of his second volume Mr. Bluemel gives a few simple directions to parents as to how to train a child to speak. He goes so far as to say, with regard to the results of such training, that, were it generally adopted, "we should in a few decades hear little more of stammering." We cordially agree with him. But we do not understand how such simple measures could supply a deficiency in the hearing for vowel sounds. On the other hand, we can well understand if stammering be due to a motor error, casual to begin with but habitual later on, how education at a suitable age would correct that error, and by increasing the strength and independence of the nerve-centres concerned would render them normally active.

Habitual stammering is, in other words, preventable. It can also be eradicated if the habit is but newly acquired. But once it is firmly established stammering, like any other bad habit, cannot be cured. At the best it can only be improved by being modified and disguised.

Dan McKenzie.

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**REPORTS FOR THE YEAR 1914 FROM THE EAR AND THROAT
DEPARTMENT OF THE ROYAL INFIRMARY, EDINBURGH.**

Under the care of A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.

PART III.

TUBERCULOSIS OF THE MIDDLE-EAR (LEFT IN
CHILDREN: A CLINICAL AND PATHOLOGICAL STUDY.

BY A. LOGAN TURNER, M.D., F.R.C.S.E., AND J. S. FRASER, M.B.,
F.R.C.S.E.

(A) CLINICAL CONSIDERATIONS.

BY A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.

IN order to prepare material for the recent discussion on tuberculosis of the middle ear in the Section of Otology of the Royal Society of Medicine in February of this year, the writer has examined the case records of the Ear and Throat Department for the years 1907-1914 inclusive. The results of the clinical observations are embodied in the following paper, and they are dealt with here in somewhat greater detail than in the notes which appear in the *Proceedings of the Royal Society of Medicine*.

The writer proposes to deal with this aspect of the subject under the following main headings:

- (1) Age-incidence.
- (2) Δ Etiology.
- (3) Clinical appearances.
- (4) Condition found at operation.

(1) AGE-INCIDENCE.

During the period of eight years (1907-1914), which is embraced in the report, 51 children under fifteen years of age and 9 adults furnished evidence of tuberculous disease of the middle-ear cleft, giving a total of 60 cases. As the majority of the patients were children the writer proposes to consider the disease only in this group.

In order to estimate the proportion of tuberculous to non-tuberculous cases of middle-ear suppuration occurring under fifteen years of age, it was necessary to ascertain the total number of cases of suppuration visiting the department during this period. These numbered 1797, of which 51, or 2 per cent., were tuberculous. A more detailed examination of the age-incidence, however, revealed the fact that in the majority of the cases the disease commenced in the first and second year of life. The following table will illustrate the age-incidence more clearly:

Age-incidence of Middle-ear Tuberculosis during the period of eight years (1907-1914).

1797 cases of middle-ear suppuration under fifteen years: tuberculous 51—2 per cent.

505 cases of middle-ear suppuration under five years: tuberculous 48—9 per cent.

172 cases of middle-ear suppuration under two years: tuberculous 47—27 per cent.

86 cases of middle-ear suppuration in first year of life: tuberculous 43—50 per cent.

A further analysis of the cases occurring in the first year shows that in 32 of the 43 infants there was evidence of the disease in the first six months of life.

Although only 2 per cent. of the cases of middle-ear suppuration in children under fifteen were tuberculous in a period covering eight years, 84 per cent. of the cases (43 out of 51) occurred during the same period in the first year of life.

It must be admitted that the percentage of tuberculous ear disease in infants as shown by these figures is high; nevertheless

the writer is of the opinion that a more careful histological and bacteriological examination of all cases of middle-ear suppuration in very young children might disclose an even higher percentage.

While the literature dealing with middle-ear tuberculosis is pretty considerable, the writer has not had the opportunity of studying from it statistics of incidence upon a large scale. Writers generally are agreed upon the greater frequency of the condition in children and the preponderance of the cases in the very young. Siebenmann has published figures which permit of a comparison with our series of cases. They deal with a period of ten years. Tuberculosis of the middle ear was confirmed in 51 instances. Of children in the first year of life the middle-ear disease was tuberculous in 10 per cent., in the first five years of life 20 per cent., and after that period only 5 per cent. His percentage during the first year is very considerably lower than in the present series, but, on the other hand, his 20 per cent. under five years is rather more than double the writer's figure (9 per cent.).

Henrici regards one fifth of the cases of middle-ear disease in children as tuberculous, his estimate therefore being considerably lower than that revealed by the present statistics, because, as the writer has shown, one half of the cases of middle-ear suppuration in the first year were tuberculous.

Milligan regarded primary tuberculous disease of the middle ear as a much more frequent condition than was usually supposed to be the case. The writer is of the opinion that an explanation of our high percentage of cases in infants is to be found in the feeding of the children, which will now be considered under the heading of aetiology.

(2) ÆTIOLOGY.

Under this heading the two main points which call for consideration are (*a*) the form of nourishment and (*b*) the pathway of infection. It is unfortunate that the case records do not furnish in every instance information as to the feeding of the infant. Of the 51 children, however, 30, or 58 per cent., were bottle-fed babies, 4, or 8 per cent., were breast-fed, while in 17 cases no information had been obtained on this point. These percentages are calculated from the total number of children concerning whom the form of nourishment is stated. In the light of the high percentage of children known to be bottle-fed, in all probability it is fair to assume that a considerable proportion of those concerning whom there is no information were also nourished from the bottle.

It was most exceptional to obtain any history from the mother of the milk having been previously boiled or sterilised. With regard to breast-fed babies it is a common experience to hear that the breast feeding was supplemented by bottle milk.

All the children in the series, with one exception, were born and nourished during their infancy in Scotland. The writer has divided the 50 cases into two groups—(1) those that were brought up in Edinburgh and the three Lothians, and (2) those from other parts of Scotland. In group (1), Edinburgh and the Lothians, there were 31 cases; in 8, no statement was furnished, 1 was breast-fed, and 22 were bottle-fed. That is to say, that of those in which the form of nourishment was known, 95 per cent. were bottle-fed. In group (2), other parts of Scotland, there were 19. In 9 no statement was furnished, 2 were breast-fed, and 8 were bottle-fed—that is to say, 80 per cent. It is obvious from these figures that a very large percentage of the children in Scotland with tuberculous middle-ear disease were fed upon non-sterilised cows' milk.

It is now necessary to briefly refer to the milk supply of Edinburgh and the country districts in Scotland. This the writer is enabled to do through the valuable work of A. Philp Mitchell, and the present abstract of the subject is derived from his address, "Tuberculous Milk in Edinburgh: Its Relation to Surgical Tuberculosis in Children," which was read before the Scottish Metropolitan Veterinary Medical Society, June 20, 1914. Mitchell shows that, while much attention has lately been given to the establishment of better ventilated and more sanitary byres in Edinburgh, the number of tuberculous cows removed annually from the city byres remains practically the same as it did thirteen years ago. On an average, thirty tuberculous cows are removed annually from these byres. The work of inspection is carried out by one veterinary inspector, whose business it is also to visit the country byres, some 250 in number, situated in different counties in the south of Scotland. It is obvious, therefore, that the inspection must be far from adequate. The country cowsheds are much inferior to those in the city, and are for the most part dark, ill-ventilated, and either badly drained or in some cases not drained at all. The cows may be kept in these byres for years. Consequently, the opportunities for infection of human beings by milk from such byres are very considerable.

Mitchell examined 406 samples of mixed milk collected from the same number of milk shops in Edinburgh, which derived their

milk supply from the various byres just referred to. In eighty-two samples, or 20 per cent., tubercle bacilli were found. In every instance the inoculation of guinea-pigs was the method employed as being the only reliable means of examining a mixed milk for the detection of tubercle bacilli. In the light of the very imperfect existing veterinary inspection of country byres in Scotland, the above figure cannot be accepted as a true estimate of the prevalence of cows supplying tuberculous milk. Further legislative measures are required to render the milk supply more pure.

As the real solution of this problem depends largely on the proof of the infectiousness of the bovine virus for man, it is necessary to glance next at Mitchell's investigations into the subject of tuberculous cervical glands in children. His work is now sufficiently well-known, and was published in full in *The British Medical Journal*, January 17, 1914. Seventy-two consecutive cases of tuberculous cervical glands in children were investigated; of these 38 resided in Edinburgh, and 34 came from neighbouring country districts. Guinea-pig inoculations were performed. Of the 72 cases, the bovine bacillus was present in 65 instances (90 per cent.), and the human bacillus in 7 (10 per cent.). Without exception the children were twelve years of age and under, and the maximum age-incidence occurred during the second year of life. Throughout the series 84 per cent. of the children, two years of age and under, had been fed on unsterilised cows' milk since birth. A large proportion of the babies in Scotland are bottle-fed, and it is the exception rather than the rule to sterilise the milk, consequently the form of feeding is such as to favour bovine infection. In only 3 instances in the series was there a history of pulmonary tuberculosis in the patients' family, in 1 case the mother, in the other 2 the father. In each of the 3 cases the human type of tubercle bacillus was isolated from the cervical glands.

Mitchell's work has been dwelt upon mainly for three reasons: in the first place, a large part of our clinical material has been derived from practically the same areas of Scotland as his; again, the milk supply and the insanitary conditions under which it is obtained are similar; and lastly, the percentage of the children fed from birth on unsterilised milk was, in the present series of cases, even higher than in his cases. Unfortunately, there is no evidence to show whether the bovine or human strain of tubercle bacillus was present in our cases of middle-ear tuberculosis. In the light of Mitchell's work, however, it would be fair to assume

that the bovine form was mainly responsible for the disease. John Fraser, utilising the material in the Royal Hospital for Sick Children, Edinburgh, examined 70 cases of tuberculous bone disease, and found in 60 per cent. of the cases the bovine strain of tubercle bacillus.

As regards the existence of tuberculosis in other members of the family in the present series of cases, the writer has only a few isolated facts: In 3 instances, the mother was dying of pulmonary tubercle, and in 1 the father had phthisis pulmonalis. In 4 instances, therefore, there was the possibility of the infection in the child being due to the human strain of tubercle bacillus. The writer considers, however, that a satisfactory explanation has been brought forward of the high percentage of cases of middle-ear tuberculosis occurring in the Ear and Throat Department in Edinburgh.

(2) *The Path of Infection.*—It only remains for us now to consider the pathway of infection. Most writers are agreed that in the majority of cases of middle-ear tuberculosis in children, the infection reaches the ear through the Eustachian tube. This may occur in two ways, either by the infectious material passing through the lumen of the tube without involving its lining membrane or by the direct extension of the tuberculous disease from the naso-pharynx along the lining membrane of the Eustachian tube. In either case the disease first affects the mucous membrane of the tympanum. Infection of the temporal bone by the blood-stream is probably rare in children.

If, with the evidence before us, the milk is to be regarded as the material conveying the infection, it can be readily understood how, with the tendency to regurgitation common in the infant, some of the liquid may find its way up the Eustachian tube and become a focus of infection. On the other hand, there is evidence scattered through the literature of the subject, showing the existence of tuberculous disease in the adenoid vegetations of children affected with tubercle of the middle-ear cleft. Where *post-mortem* examination has been possible and the submucous layer of the lining membrane of the Eustachian tube has been examined histologically, foci of tubercle have been observed scattered throughout it. In our series tuberculous nodules with giant cells were detected in the adenoids in one case; in another case lupus of the soft palate and pharynx was the primary focus from which the tubercle spread to the ear.

(3) CLINICAL CHARACTERS OF MIDDLE-EAR TUBERCULOSIS.

The writer has analysed the outstanding clinical features of the disease as met with in our cases. These are well recognised, and permit as a rule of the diagnosis being made on clinical grounds. The sexes were equally affected, 26 being males and 25 females. The right ear only was affected in 26 and the left in 14, while in 11 cases the disease was bilateral.

(a) *Mode of Origin*.—This is, as a rule, of a quiescent character, and in 92 per cent. no history of apparent pain, restlessness, or fever could be obtained either preceding or accompanying the onset of the ear affection. In 3 instances, however, the condition appeared to commence with a slightly acute onset. No history of the previous occurrence of measles or scarlet fever was ascertained. As a rule, the mother's attention is first drawn to the ear by observing the presence of discharge; this was the case in 45, or 88 per cent., of the cases. In 2 enlarged periotic glands were first observed, and in 1 the ear discharge and facial paralysis were noticed at the same time.

(b) *Enlarged Periotic Glands*.—This was a marked feature of the disease, the enlarged glands in the neighbourhood of the ear being noted in 95 per cent. of the cases. In a number of them caseation and suppuration occurred.

(c) *Facial Paralysis*.—This was present in 45 per cent. of the cases. In none of those in which the disease affected both ears, was a bilateral facial paralysis observed.

(4) PATHOLOGICAL CONDITIONS FOUND AT OPERATION.

Just as these cases present clinically certain features which justify the diagnosis of their tuberculous character, so at operation certain pathological appearances are observed which are more or less common to this type of case. A lesion of the bone is very frequent, either of the nature of caries or in the form of a sequestrum. Carious bone was found in 65 per cent. of the 35 cases operated upon and a sequestrum in 60 per cent., not including necrosis of the labyrinth. In some cases the outer antral wall lay loose and could be readily picked out with forceps. A sequestrum was also found in other areas such as the anterior and posterior meatal walls and the roof and floor of the tympanum. Granulation tissue was a common feature, the granulations often presenting a pale, flabby appearance. Caseous material was noted

both in the antrum and tympanum in several cases. Occasionally an ossicle was found lying loose in the cavity, while in nine instances the malleus and incus were noted as absent. In no case was any cholesteatoma found.

Actual proof of the presence of the tuberculous character of the disease was furnished in 20 cases, and was of the following nature: In 1 the inoculation of a guinea-pig with the scrapings from the cavity produced a general tuberculosis; in 2 tubercle bacilli were clearly demonstrable in the discharge; in 14 giant cell systems were seen in the granulations; while in 3 evidence of the tuberculous nature of the disease was furnished by histological examination of the temporal bone after death. The absence of any positive evidence of tubercle in the remainder of the cases was not due to our inability to find the same. Microscopical evidence of such was not sought for, the diagnosis being based upon the typical clinical features of the disease to which attention has already been drawn in this paper, while in the remaining cases operated upon, additional evidence was obtained from the pathological appearances observed at the operation.

Concomitant Affection of the Labyrinth.—Owing to the extreme youth of the patients it was found impossible to carry out any functional examination of the cochlea and vestibular nerves. The condition of the internal ear was, therefore, only approximately determined in those cases which were submitted to operation. In 35 of the series the mastoid operation was performed. The labyrinth was found to be necrosed in whole or in part in 8 of these, or in 22 per cent.

In addition to these, however, the external labyrinthine wall showed pathological changes in 11 cases, *i.e.*, 19 out of 35 cases showed labyrinthine changes (54 per cent.). The lesions observed were of the nature of superficial erosion and pitting and softening of the bony capsule in the region of the external semicircular canal, facial canal, and promontory. In addition to these facts, we noted that in a few instances in subsequent examinations of

FIG. 1.—Case 1: Right ear, section 140. Early tubercular disease of the ear. Tubercular infiltration and erosion of walls of tympanic cavity. 1, basal coil of cochlea; 2, tubal portion of tympanic cavity; 3, tensor tympani; 4, tubercular tissue in roof of cavity; 5, cochlear nerve in internal auditory meatus.

FIG. 2.—Case 1: Right ear, section 305. Early tubercular disease of the ear. Tubercular infiltration of floor of tympanic cavity reaching the jugular bulb. 1, tubercular erosion of promontory; 2, tubercular tissue in niche of oval window; 3, tubercular tissue in roof of tympanum; 4, facial nerve; 5, sacculus; 6, cochlear opening of ductus perilymphaticus; 7, tubercular granulation tissue extending down to jugular bulb.

PLATE I.

FIG. 1.

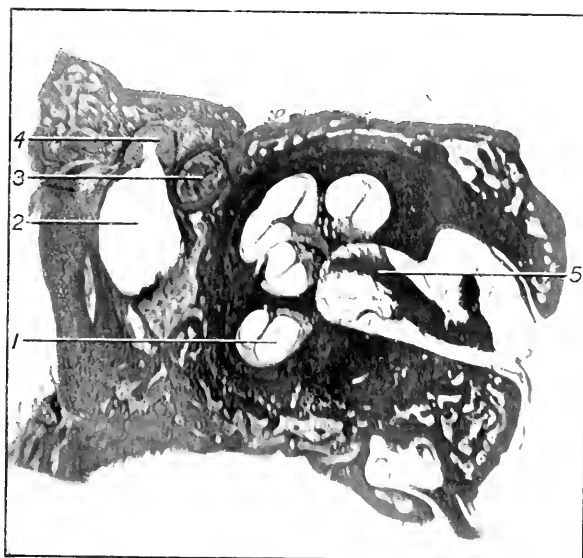
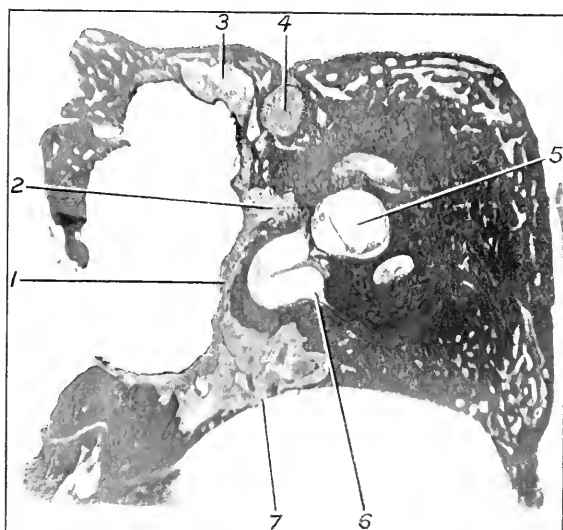


FIG. 2.



TO ILLUSTRATE DR. LOGAN TURNER AND MR. J. S. FRASER'S PAPER ON
TUBERCULOSIS OF THE MIDDLE-EAR CLEFT IN CHILDREN.

the patients after their dismissal from hospital, necrosed bone was present in the site of the labyrinth, indicating that the disease had progressed since it was first dealt with.

Tuberculous Meningitis.—Two of the patients who were operated upon died with tuberculous meningitis, that is to say in 5 per cent. of the cases operated upon. It has not been found that operation, as a rule, was a factor in the production of a generalised tuberculosis. As the writer has been unable to trace the majority of his cases subsequent to treatment, it is impossible to give any statistical results. Experience, however, would lead to the conclusion, that operative procedures are far from satisfactory in this class of case, and that we have generally failed to eradicate the disease. In the course of the post-operative treatment, the writer has found the administration of a vaccine made from the pyogenic organisms useful; we have also employed in a few cases the Pfannenstiel method, administering sodium iodide internally, and bathing the wound in peroxide of hydrogen by plugging it with gauze soaked with this solution.

(B) PATHOLOGY.

BY J. S. FRASER, M.B., F.R.C.S.

I. CLINICAL HISTORY OF, AND RESULTS OF MICROSCOPIC EXAMINATION IN, THREE CASES OF TUBERCULAR OTITIS IN INFANTS.

Case 1.—W. Y.—, aged one year and three months. Child was bottle-fed. Parents noted one month before admission that the child's face was a little drawn to the right side. No history of measles or scarlet fever, but both ears have been discharging for some months; apparently child has never had any pain in the ear.

Examination.—Partial paralysis of left side of face. Foul pus in left meatus and swelling of posterior wall. No mastoid swelling, but a few shotty glands behind sterno-mastoid. Right meatus also contains pus and granulation tissue.

June 4, 1913: Operation, left side. Cortex healthy, antrum contained granulation tissue, bone around soft; Eustachian tube contained swollen mucosa; granulations in oval and round windows; large area of dura exposed to get beyond diseased bone. Malleus and incus absent; no naked-eye appearance of labyrinth disease.

June 9, 1913: Stitches removed; offensive discharge. Temperature normal before and since operation.

June 20, 1913: Left ear clean, but right very dirty.

June 26, 1913: Operation right ear. Bone rather soft; a good deal of granulation; inner wall seemed healthy.

June 27, 1913: Temperature rose to 102.6° F.

June 28, 1913: Child very restless, has a dusky colour this morning; rapid respiration; squinting; vomiting; broncho-pneumonia present. 4 p.m.: Temperature, 104° F. Child died in the evening.

Post-mortem.—Tuberculosis of right lung and of bronchial glands. Mesenteric glands enlarged and caseous. No tubercle of brain.

Note.—Guinea-pigs inoculated from lymphatic glands removed from back of left ear showed definite tuberculosis. Granulation tissue from the ears showed small tubercular areas. The photomicrographs were prepared from the right ear, in which the tubercular disease was less advanced than in the left. The illustrations show a comparatively early stage of tubercular disease of the ear involving the mucous membrane of the middle ear and eroding the bony wall of the promontory. The labyrinthine involvement through the oval and round windows is just beginning (*see* Figs. 1, 2, 3, 4 and 5).

Microscopic Examination (Right Ear.)

Eustachian Tube.—Mucosa thickened, vascular, infiltrated with small cells; tubercular nodules present in submucosa. As the tube was curetted at operation one cannot speak as to ulceration of the mucosa, but there are cystic spaces filled with pus in the inner wall of the tube.

Tympanic Cavity.—The superficial epithelium is absent over large stretches of the mucosa—a condition seldom or never found in genuine otitis media of non-tubercular origin. In the roof of

FIG. 3.—Case 1: Right ear, section 350. Early tubercular disease of the ear. Invasion of vestibule through oval window; erosion of promontory; niche of round window filled with tubercular granulation tissue. 1, membrane of round window; 2, tubercular erosion of promontory; 3, head of stapes; 4, tubercular tissue in niche of oval window; 5, facial nerve; 6, vestibular nerve to utricle, external and superior canals; 7, footplate of stapes, eroded and displaced towards vestibule; 8, vestibular nerve to ampulla of posterior canal; 9, tubercular tissue filling up niche of round window.

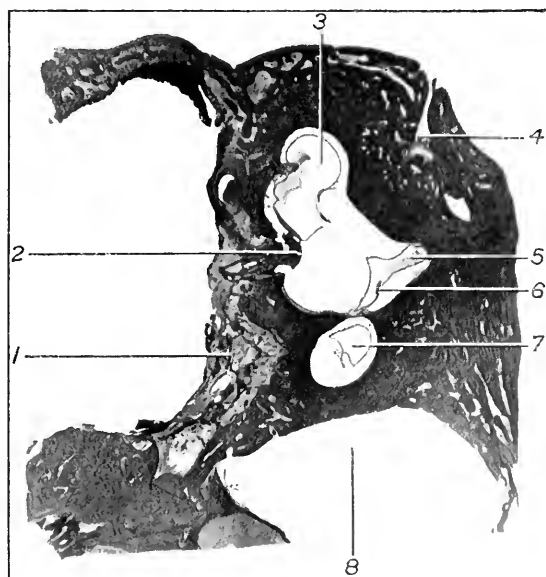
FIG. 4.—Case 1: Right ear, section 425. Early tubercular disease of the ear. Showing erosion of inner wall of tympanum. 1, tubercular tissue in region of sinus tympani; 2, footplate of stapes displaced towards vestibule; 3, ampullary end of superior canal with crista and cupula, the latter surrounded by coagulated lymph; 4, cranial end of fossa subarenata; 5, endolymphatic space of crus commune; 6, crista quarta; 7, ampullary end of posterior canal; 8, jugular bulb.

PLATE II.

FIG. 3.



FIG. 4.



TO ILLUSTRATE DR. LOGAN TURNER AND MR. J. S. FRASER'S PAPER ON
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the tympanic cavity there is a small abscess in the submucous tissue. Tubercular granulation tissue is seen extending into the marrow spaces in the roof of the tympanum. The sinus tympani shows much tubercular granulation tissue in the submucosa. Tubercular granulation tissue is present in the inner wall of the antrum and can be traced from this for some distance through the nucleus of the labyrinth (fossa subarcuata).

Muscles.—Both the tensor tympani and stapedius muscles are infiltrated with small cells.

Oval Window.—The stapes is eroded and displaced towards the vestibule (Fig. 3). There is granulation tissue present between the footplate of the stapes and the endosteum of the vestibule. Pus can be seen above the stapes between the margin of the oval window and the endosteum. At the lower margin of the oval window the annular ligament is disintegrated, the endosteum is ruptured at one spot and the purulent infiltration has entered the perilymph space of the vestibule, and, penetrating Reisner's membrane, has entered the cochlear canal.

Round Window.—The secondary tympanic membrane is greatly thickened, the niche of the round window being filled with swollen mucosa containing tubercular granulation tissue.

Marrow Spaces.—Above the cochlear capsule the marrow spaces are very vascular, while below they are fibrous and show giant-cell systems. The fossa subarcuata in the centre of the labyrinth nucleus contains tubercular granulation tissue. The facial canal is dehiscant above the oval window, and the canal itself contains granulation tissue.

Cochlear Capsule.—The lamella bone over the promontory is eroded, but the cartilage bone is almost entirely healthy. The bony wall of the external canal prominence is also eroded, but a fistula has not formed.

Cochlea.—There are curdled lymph and mononuclear cells in the scala tympani of the basal coil, especially just above the round window membrane. In all coils the epithelium of the stria vascularis is desquamating, and Corti's organ is almost disintegrated (artefact?). The pillar cells can be recognised with difficulty in places. Reisner's membrane is perforated just below the oval window, and small round cells are present in the ductus reuniens. The perilymphatic aqueduct contains a few round cells at the opening from the scala tympani of the cochlea. The spiral ganglion cells appear somewhat shrunken—artefact?

Vestibule.—As stated above the tubercular infiltration internal

to the footplate of the stapes has, at one spot, broken through the endosteum and invaded the perilymph space of the vestibule. In other respects the perilymph space is normal. The utricle contains some curdled lymph, but the neuro-epithelium of the saccule and utricle are well preserved. The ductus endolymphaticus contains a few round cells in its intra-vestibular portion. Just above and internal to the oval window the branch of the vestibular nerve to the utricle and cristæ of the external superior canals is infiltrated with pus cells.

Canals.—Curdled lymph is present in superior and external membranous canals. In the crus commune there are a few round cells, and also in the perilymph space of the external canal. The posterior canal is normal.

Internal Meatus.—Vessels are greatly dilated. The cochlear and vestibular nerves appear normal.

Carotid canal is normal.

Jugular Bulb.—The bony floor of the tympanum is eroded, so that the tubercular granulation tissue in the floor of the tympanic cavity reaches the fibrous tissue of the jugular bulb.

Remarks on Case 1.

The case was one of infiltrating tuberculosis affecting the mucosa of the middle-ear cleft. The infection had apparently spread up the tube and involved the mucosa of the tympanum, attic, and mastoid antrum; from the inner wall of the antrum it had spread along the vessels of the fossa subarcuata towards the cranium. The tympanic muscles were also involved by the infiltration along with the facial canal on the inner tympanic wall. The infiltration of the tympanic floor extended down to the jugular bulb. Invasion of the labyrinth was just beginning—the oval window being specially affected, the annular ligament almost disintegrated, and the endosteum lining the vestibule perforated at one point. The round window membrane was not involved to the

FIG. 5.—Case 1: Right ear, section 600. Early tubercular disease of the ear. Inner wall of antrum. Showing path of invasion from inner wall of antrum along vessels of fossa subarcuata. 1, stapedius muscle; 2, facial nerve; 3, two ends of external canal; 4, tubercular tissue on inner wall of aditus; 5, tubercular infiltration in fossa subarcuata; 6, two ends of posterior canal.

FIG. 6.—Case 2: Right ear, section 90. Advanced tubercular disease of the ear. Vertical transverse section through apex of petrous bone. 1, region of Eustachian tube; the cartilaginous tube has disappeared; caseating tubercle is seen to the left of and below the internal carotid artery; 2, internal carotid; 3, apex of petrous bone; in this region the bone consists largely of marrow spaces.

PLATE III.

FIG. 5.

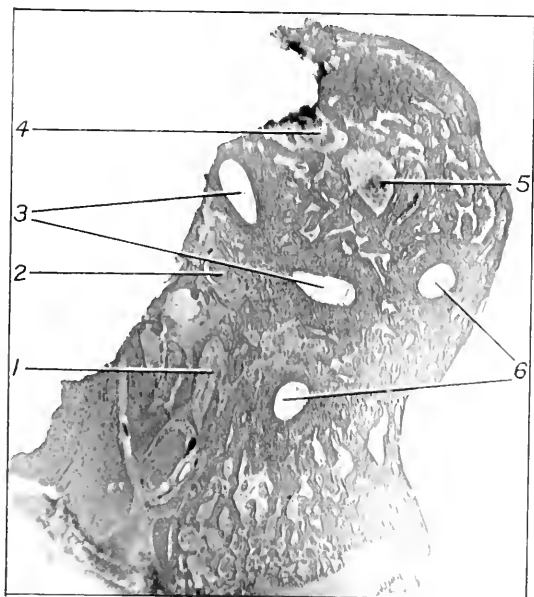
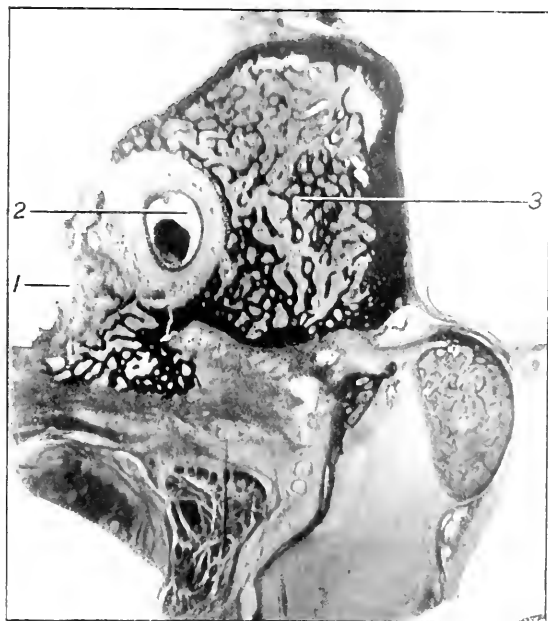


FIG. 6.



TO ILLUSTRATE DR. LOGAN TURNER AND MR. J. S. FRASER'S PAPER ON
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same extent and was not perforated; there was, however, some "induced" labyrinthitis in the scala tympani of the basal coil in the region of the round window.

Case 2.—J. N.—, male, aged nine months (a twin), had epileptic fits at the age of six weeks; a fortnight later the right ear began to discharge; the fits continued at intervals. At the age of three months the right ear was operated upon at another hospital, but the discharge continued.

Examination (August 3, 1910): Child markedly wasted; month shows thrush; frequent vomiting; profuse nasal discharge (*Staphylococcus aureus*, diphtheroid bacilli, and diplococci). Child's head sweats profusely and is markedly retracted; photophobia present. There are enlarged glands below the right ear, and behind the ear there is a fistula discharging pus. The right side of the face is paralysed.

August 4, 1910: Operation. Large flat sequestrum removed from roof of middle ear, exposing the dura. Sequestrum also removed from floor of middle ear and another from the inner wall, opening up the cochlea, vestibule, semicircular canals, and Fallopian aqueduct.

August 5 to 16, 1910: Progressive emaciation and glandular enlargement; wound cavity very dirty and shows few granulations.

August 17, 1910: Death.

Post-mortem: Membranes of brain injected; increase of cerebro-spinal fluid. Tubercular nodule in right anterior corpus quadrigeminum and another in the occipital region. The dura of the right middle fossa showed tubercular thickening.

Microscopic Examination (Right Ear).

Eustachian Tube.—The walls of the bony portion of the Eustachian tube are destroyed, so that the dura above and the internal carotid artery (to the inner side and below) are infiltrated with tubercular tissue (Figs. 6 and 7).

Tympanic Cavity.—The anterior part of the tympanum shows marked tubercular infiltration with caseation. The bony wall (cochlear capsule) is eroded—both lamellar and cartilage bone being involved (Fig. 8).

Oval and Round Windows.—Absent through disease.

Tympanic Muscles.—Absent through disease.

The dura mater of the middle fossa in the roof of the Eustachian

tube and tympanic cavity is greatly thickened by tubercular infiltration (Fig. 8).

Marrow spaces in front of cochlea are markedly congested; below the cochlea the marrow spaces are fibrous and show tubercular granulation tissue, which extends up to the dura mater of the posterior fossa. The tubercular infiltration below the cochlea reaches the aqueduct of the cochlea at its cranial end.

Facial Canal.—Only the first part of the canal which starts from the fundus of the internal meatus is present (Fig. 8); the rest is absent through disease.

Cochlea.—All coils are filled with granulation tissue. No giant cell systems are seen, but there is a good deal of caseation. The modiolus is present and the bony spiral laminae is still visible, but all membranous structures have disappeared. The outer wall of the cochlea is almost entirely eaten away. The ganglion cells in the modiolus are not recognisable. There is a fistula from the middle ear into all three scalae of the cochlea. In the basal coil the scala tympani contain delicate fibrous tissue towards the internal meatus and modiolus, but near the fistula into the middle ear the tissue is more granular. The aqueduct of the cochlea at its cranial end contains pus cells, which appear to have entered from one of the diseased air cells which extend below the cochlea. (From the appearances present it is evident that there was a mixed infection of the labyrinth in this case.)

Vestibule and Canals.—There is a large fistula from the middle ear into the vestibule, and all membranous structures have disappeared except the aqueduct, which, at the vestibular end, is plugged with granulation tissue and pus. The succus is normal. The nucleus of the labyrinth appears to have broken down into a tubercular abscess, and the disease has spread along the fossa subarcuata. The dura in the roof of the vestibule is very thick, and the superior petrosal sinus is in contact with tubercular tissue,

FIG. 7.—*Case 2*: Right ear, section 200. Advanced tubercular disease of the ear. Vertical transverse section through anterior part of petrous pyramid. 1, internal carotid artery; 2, tubercular granulation tissue infiltrating the wall of carotid artery; 3, region of Eustachian tube; the tube can no longer be recognised; 4, anterior part of petrous pyramid.

FIG. 8.—*Case 2*: Right ear, section 337. Advanced tubercular disease of the ear. Vertical transverse section through cochlea, showing fistulae into cochlea: cochlea is full of tubercular granulation tissue. 1, fistula into basal coil of cochlea; 2, middle coil of cochlea; all scalae are filled with tubercular granulation tissue; the osseous spiral lamina is still to be seen; 3, fistula into apex of cochlea; 4, cartilage bone capsule of cochlea; 5, lamellar bone surrounding cochlear capsule; 6, tubercular pachymeningitis in floor of middle cranial fossa; 7, facial nerve; 8, auditory nerve; 9, cellular infiltration in fundus of internal meatus.

PLATE IV.

FIG. 7.

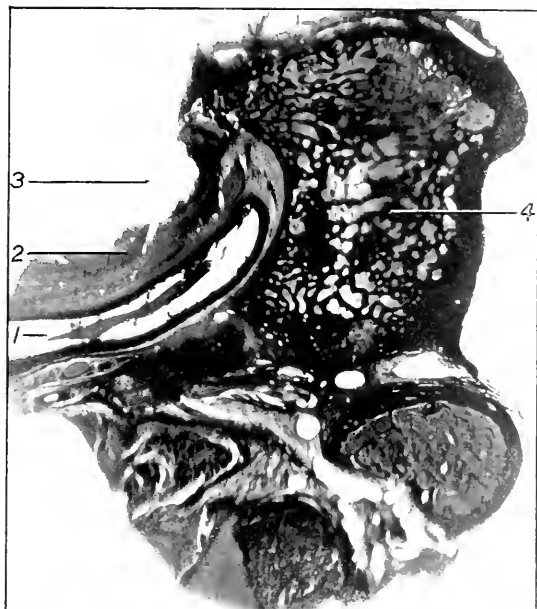
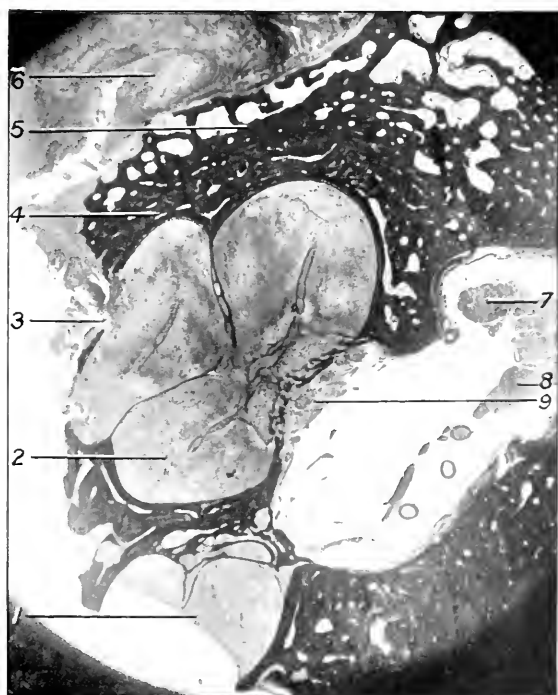


FIG. 8.



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which has apparently spread along the subarcuata fossa. The superior canal contains fibrin, and the endosteal vessels are dilated. The membranous canal is still visible at parts, and towards the ampullary end is full of pus. The external canal has disappeared entirely, while the posterior canal contains pus in both ends.

Internal Meatus.—Shows greatly engorged and dilated vessels; there are a few pus cells in the fundus of the internal meatus.

Remarks on Case 2.

This case was one of the severe type of tubercular otitis media and interna—the necrotic form. In this case also the infection appears to have come by way of the tube, and the carotid canal was invaded by tubercular disease. From the appearances present in the cochlea and from the findings at operation it appears there was a marked degree of mixed infection, though, unfortunately, no swab of the pus from the middle ear was examined.

In spite of the large area of necrosis, which included the promontory, the external canal, part of the superior and posterior canals, and almost the whole of the Fallopian aqueduct, there is no evidence of gross disease of the labyrinthine artery in the internal meatus: the walls of the vessel appear to be somewhat thickened, and in the fundus of the meatus there is some cellular infiltration (Fig. 8).

The extensive necrosis seems to have been due to the mixed infection rather than to any gross disease of the artery supplying the labyrinth capsule.

Case 3.—J. C——, male, aged nine months (breast-fed). Nasal catarrh and obstruction since birth; left-sided otorrhœa of ten weeks' duration; no history of crying before discharge began; swelling behind left ear for eight weeks. Wilde's incision made by patient's doctor.

Examination.—Very marked adenoids; large kidney-shaped perforation of left tympanic membrane. Otorrhœa right side also.

Adenoid Operation.—Child admitted to ward; vomiting after meals; no signs of tubercle in lungs.

Radical Mastoid Operation.—Much granulation tissue.

Progress.—Vomiting continued; head retraction developed; meningitic cry; internal strabismus left eye; no optic neuritis or tubercle of choroid; cerebro-spinal fluid clear—slight increase in mononuclear cells. Death.

Post-mortem.—Tubercular meningitis and general tuberculosis.

Microscopic Examination (Left Ear).

Middle Ear.—The mucous membrane is greatly thickened and infiltrated with tubercle over the lower part of the promontory and in the niche of the round window. In the latter position giant cell systems are present. Over the upper part of the promontory the mucosa is absent—operation?

The stapes is absent and there is a large fistula into the labyrinth through the oval window. The bony margins of the window are eroded, especially the lower margin. There is a second fistula between the scala vestibuli of the basal coil of the cochlea and the tympanic cavity (Fig. 10). This appears to have been due rather to a bursting of inflammatory products from the scala vestibuli into the tympanic cavity than to an invasion of the scala vestibuli by tubercular disease of the promontory.

The outer wall of the facial canal above and behind the oval window is dehiscant, but bony erosion by disease is also present.

The round window membrane is greatly thickened and infiltrated.

Cochlea.—The basal coil of the cochlea in its lower part is entirely filled up with new connective tissue and bone; the new bone formation is especially marked in the scala tympani and occludes the opening of the perilymphatic duct. There is some new endosteal bone in the scala vestibuli. The spiral canal in the

FIG. 9.—*Case 2*: Right ear, section 750. Advanced tubercular disease of the ear. Vertical section through posterior part of petrous bone. The outer wall of the vestibule has been destroyed by the disease. 1, large gap in wall of labyrinth; the ampullary end of the posterior canal, both parts of the external canal and the facial nerve are absent; 2, ampullary end of superior canal; 3, tubercular infiltration in fossa subarcuata; 4, smooth end of superior canal; 5, smooth end of posterior canal; 6, sacculus endolymphaticus; the tubercular infiltration reaches to the outer wall of the sacculus.

FIG. 10.—*Case 3*: J. C.—, aged nine months. Fibro-ossifying type of tubercular otitis. Vertical section of left inner ear (section A). 1, cochlear nerve in internal meatus infiltrated by tubercle; 2, small cell infiltration in fundus of vestibule; 3, dilatation of cochlear canal in middle coil; 4, new formation of fibrous tissue and bone in scala vestibuli of middle coil; 5, lamellar bone surrounding cochlear capsule; 6, cartilage bone capsule of cochlea; 7, facial nerve; 8, apical coil of cochlea; 9, tubercular erosion (fistula) in basal coil; 10, basal coil filled by granulation tissue and new bone; 11, niche of round window filled with tubercular granulation tissue.

FIG. 11.—*Case 3*: Fibro-ossifying type of tubercular otitis. Vertical section of left inner ear (section B). 1, new connective tissue and bone in wall of vestibule; 2, middle cranial fossa; 3, facial nerve; 4, dehiscence in facial canal; 5, large fistula into vestibule in region of oval window—the promontory has disappeared; 6, tubercular sequestrum in lower part of vestibule.

FIG. 12.—*Case 3*: Fibro-ossifying type of tubercular otitis. Vertical section of left inner ear (section C). 1, new formed bone partially filling up vestibule and region of ampullary end of posterior canal; 2, middle cranial fossa; 3, dehiscence in facial canal caused by (?) tubercular erosion; 4, tubercular granulation tissue in centre of vestibule.

PLATE V.

FIG. 9.

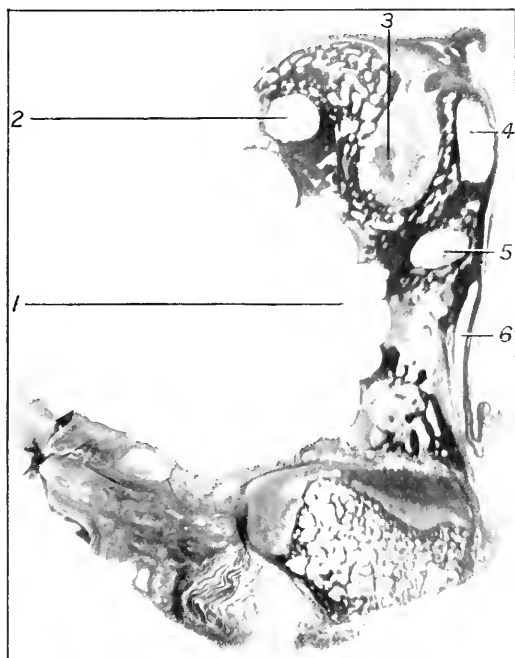
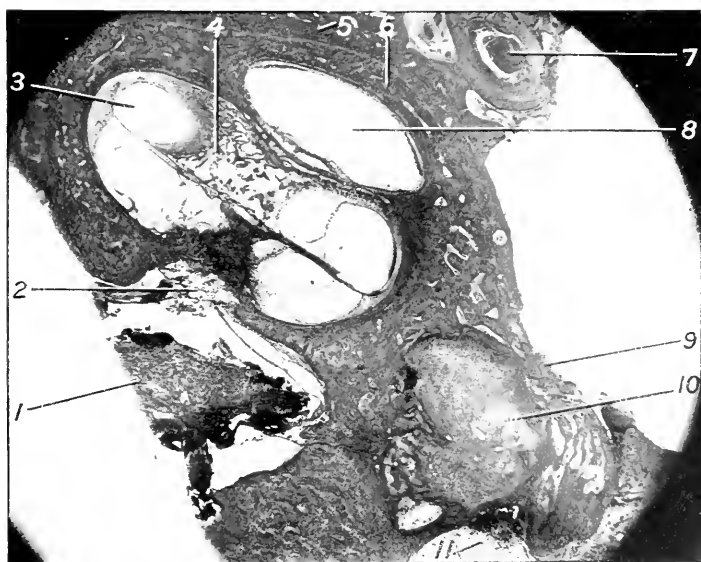


FIG. 10.



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PLATE VI.

FIG. 11.

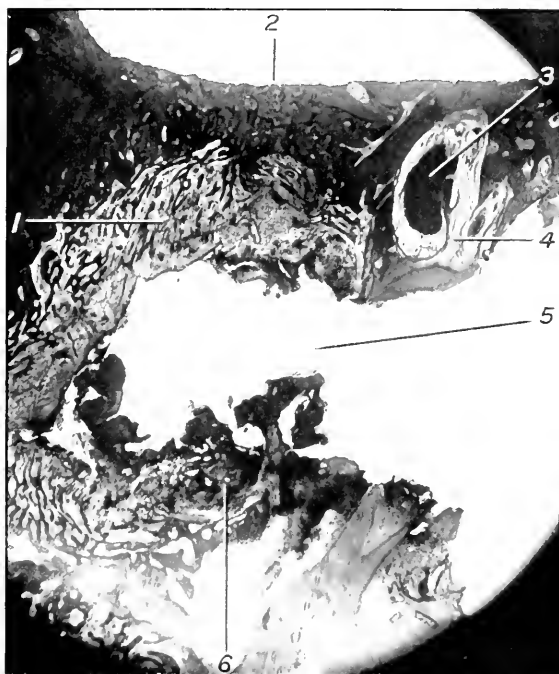


FIG. 12.



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basal coil is filled up with small cells and the ganglion cells have disappeared. No trace of Corti's organ remains. In the middle coil there is formation of new connective tissue with a little new bone in the scala tympani; this gets less as one passes up towards the apex. The scala vestibuli shows marked new bone formation, especially in that part nearest to the basal coil. The new formation appears to have proceeded from the modiolus to some extent. The cochlear canal itself is greatly dilated by contraction of the new connective tissue in the scala vestibuli, pulling on Reissner's membrane. In the middle coil Corti's organ is represented by a low mound of cells in which pillar cells cannot be recognised. The epithelium of the stria vascularis is degenerated, and tubercular infiltration is present in parts. In the apical coil the changes are similar to those in the middle coil, but less marked. The modiolus is markedly infiltrated with small cells, but in the middle and apical coils remnants of the spiral ganglion and nerve can be made out, especially in the upper part. The cartilage bone capsule of the cochlea is intact, except in the area of erosion over the promontory.

Vestibule and Canals.—The vestibule shows considerable amount of new fibrous tissue and bone formation from the endosteum. There is a large cavity in the centre, lined by tubercular granulation tissue which shows giant cells in parts and, in others, caseation and sequestrum formation. No membranous structures are visible. The canals are also entirely replaced by new formation of connective tissue and bone.

Internal Meatus.—The nerves here are infiltrated by small mononuclear cells, especially the branches to the basal coil of the cochlea. In parts the infiltration amounts to nodule formation. The dura mater lining the meatus is not thickened.

Remarks on Case 3.

The well-marked tubercle follicles present in the tympanic mucosa in this case point to a chronic form of tuberculosis. The condition of the labyrinth is very interesting as there is great evidence of an attempt on the part of nature to achieve a spontaneous cure of tubercular labyrinthitis by a process of fibrosis and new bone formation. (This condition is by no means uncommon as the result of ordinary suppurative labyrinthitis. The writer has microscopically examined four cases of spontaneous cure of ordinary purulent labyrinthitis obtained from human subjects and two cases in laboratory animals, which were present by the kindness of other investigators.) As far as the writer has been

able to look up the literature of the subject he has not found any record of a case similar to the present one (Case 3), in which there was an almost complete spontaneous cure of tubercular labyrinthitis. The invasion of the labyrinth appears to have taken place mainly through the oval window into the vestibule, and, to a less extent, through the round window into the cochlea.

II. EXPERIMENTAL TUBERCULAR DISEASES OF THE EAR.

In 1910 and 1911 the writer performed fourteen experiments on guinea-pigs. The animals were anaesthetised and the right tympanic cavity was inoculated through the tympanic membrane with emulsions of various organisms. The experiments may be divided into two groups: (a) In nine cases, in which the tubercle bacillus was *not* injected, the organisms were as follows: *Staphylococcus aureus*, 1; *Streptococcus pyogenes*, 2; pneumococcus, 1; *Bacillus coli*, 2; *Bacillus proteus*, 1; *Bacillus of distemper*, 2. In only four out of the nine cases was otitis media found to be present in the inoculated tympanic cavity at the *post-mortem*, and in no case was labyrinth suppuration discovered on subsequent microscopic examination of the ear. (b) In five guinea-pigs the tubercle bacillus was employed for inoculation—in four cases in pure culture and in one in combination with the *Staphylococcus aureus*. In only one of the five cases was there failure to produce otitis media. In one case there was otitis media and slight serous labyrinthitis; tubercle bacilli present in the middle-ear pus. This

FIG. 13.—Tubercular disease of adenoid post-nasal growths. 1, stratified squamous epithelium on surface of adenoid growths replacing the normal stratified ciliated columnar epithelium; 2, giant cells in sub-epithelial lymphoid tissue.

FIG. 14.—*Guinea-pig P*: Tubercular disease of the ear (experimental) (section 85). Horizontal section through right ear, showing perforation of footplate of stapes by pus and invasion of perilymph space of vestibule. 1, external canal; 2, incus; 3, malleus; 4, pus in tympanic cavity; 5, anterior part of footplate of stapes; 6, external meatus; 7, capsule of cochlea; 8, nerves in internal meatus; 9, perforation of footplate of stapes by pus which is pushing inwards the endosteum covering the inner surface of the footplate and invading the perilymph space of the vestibule; 10, posterior part of stapes footplate.

FIG. 15.—*Guinea-pig P*: Tubercular disease of the ear (experimental) (section 105). Horizontal section through right ear, showing invasion of perilymph space of basal cochlear coil through round window. 1, external canal; 2, pus in niche of round window invading scala tympani of basal coil; 3, new connective tissue in scala tympani of basal coil of cochlea; 4, vestibule; 5, sinus tympani full of pus.

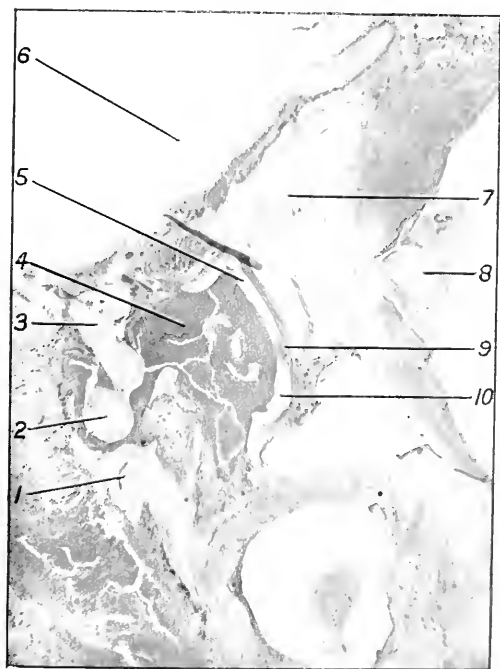
FIG. 16.—*Guinea-pig N*: Tubercular disease of the ear (experimental) (section 35). 1, new bone formation in external meatus; 2, facial nerve; 3, vestibule; 4, new bone formation in tympanic cavity; 5, early stage of fistula into external canal from middle ear—the bone has been completely eroded by tubercular disease, but the perilymphatic space is still normal; 6, pus in tympanic cavity.

PLATE VII.

FIG. 13.



FIG. 14.



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PLATE VIII.

FIG. 15.



FIG. 16.



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case may be regarded as showing that tubercular otitis media can give rise to induced (serous) labyrinthitis, as the structures of the oval and round windows were intact. In the other three cases (guinea-pigs *D*, *N*, and *P*) there was tubercular otitis media and labyrinthitis—the inner ear being invaded through the oval and round windows (*see* Figs. 14 to 20).

Guinea-pig P.—Right tympanic cavity inoculated through drum-head with bovine tubercle bacilli emulsion on April 2, 1911. The animal died on May 22, 1911. *Post-mortem*: Extensive caseation of lymphatic glands. The mucosa of the right tympanic cavity was greatly swollen. A few tubercular bacilli were found in the pus in the right middle ear. Sections 85 and 105 show invasion of labyrinth through oval and round windows.

Guinea-pig N.—The right tympanic cavity was inoculated with bovine tubercle bacilli and staphylococci on February 11, 1911. The animal died on April 7, 1911, and the *post-mortem* examination showed well-marked tuberculosis of lymphatic glands, liver, spleen, lungs, and heart. Sections 35, 45, and 110 show invasion of labyrinth in region of external canal, oval and round windows.

Guinea-pig D.—Right tympanic cavity inoculated through drumhead with emulsion of human tubercle bacilli on November 17, 1910. The animal died on February 10, 1911. *Post mortem*: Tuberculosis of lymphatic glands, liver, and spleen. An extra-dural abscess was found in the middle fossa on the right side. The right middle ear was full of pus, which contained tubercle bacilli, streptococci, and staphylococci. Sections 110 and 155 show invasion of labyrinth through oval and round windows.

[The writer wishes to acknowledge a grant from the Carnegie Trust towards the expenses of this investigation.]

The results of the experiments show that—in guinea-pigs at any rate—tubercular otitis media is much more likely to lead to labyrinthitis than is otitis media due to ordinary pus-forming organisms. The experiments further demonstrate that the windows are the predilection spots for invasion of the labyrinth, and that the apex of the cochlea and the external canal are less frequently involved. (In guinea-pigs the apex of the cochlea projects markedly into the tympanic cavity, and therefore would appear to be more liable to erosion than in the human subject.) When the oval window is invaded the disease appears to affect the footplate of the stapes, and in two of the three cases has perforated the footplate; in only one case does the infection appear to have specially attacked the annular ligament (guinea-pig *D*), though in this case also the

footplate of the stapes is eaten through (Fig. 19). The endostem of the vestibule in the neighbourhood of the oval window seems to have considerable power of resistance, and is pushed inwards towards the cavity of the vestibule by the granulation tissue and pus which gathers between it and the stapedia footplate (Figs. 14, 17, and 19).

In the region of the round window, on the other hand, the inflammatory process enters the scala tympani and spreads more rapidly. Figs. 15, 18, and 20 show purulent infiltration of the scala tympani in the basal coil; the condition here appears to be much more acute than that shown in the vestibule in Figs. 14, 17, and 19.

It is possible that invasion through the round window is rather later than that by way of the oval window, but the former is more severe when it occurs. In only one of the three cases was there any intracranial lesion (guinea-pig *D*—extra-dural abscess in middle fossa of inoculated side). It is noteworthy that guinea-pig *D*, which was inoculated with the human type of tubercle bacillus, lived considerably longer than guinea-pigs *P* and *N*, which were inoculated with the bovine type. The type of tubercular ear disease also seems to have been milder in the case of guinea-pig *D*.

FIG. 17.—*Guinea-pig N*: Tubercular disease of the ear (experimental) (section 45).

1, posterior part of footplate of stapes; 2, facial nerve; 3, anterior part of footplate; 4, basal coil of cochlea; 5, perforation of footplate of stapes and invasion of perilymphatic space of vestibule by tubercular granulation tissue and pus which are pushing towards the endosteum; 6, saccule; 7, utricle.

FIG. 18.—*Guinea-pig N*: Tubercular disease of the ear (experimental) (section 110).

Horizontal section through right ear, showing invasion of labyrinth through round window. 1, external canal; 2, facial nerve; 3, invasion through membrane of round window; 4, erosion of apex of cochlea; 5, dilated cochlear duct of basal coil; 6, new connective tissue in scala tympani of basal coil; 7, ampullary end of posterior canal; 8, sinus tympani with granulation tissue and pus.

FIG. 19.—*Guinea-pig D*: Tubercular disease of the ear (experimental) (section 110).

Horizontal section through middle and inner ear, showing invasion of vestibule by tubercular disease through posterior margin of oval window. Granulation tissue in vestibule. 1, external canal; 2, facial canal, the nerve is displaced (artefact); 3, footplate of stapes; 4, pus; 5, tensor tympani muscle; 6, basal coil of cochlea; 7, internal meatus, pachymeningitis; 8, tubercular tissue on inner side of stapes footplate; 9, tubercular tissue stripping up the endosteum of the vestibule.

FIG. 20.—*Guinea-pig D*: Tubercular disease of the ear (experimental) (section 155).

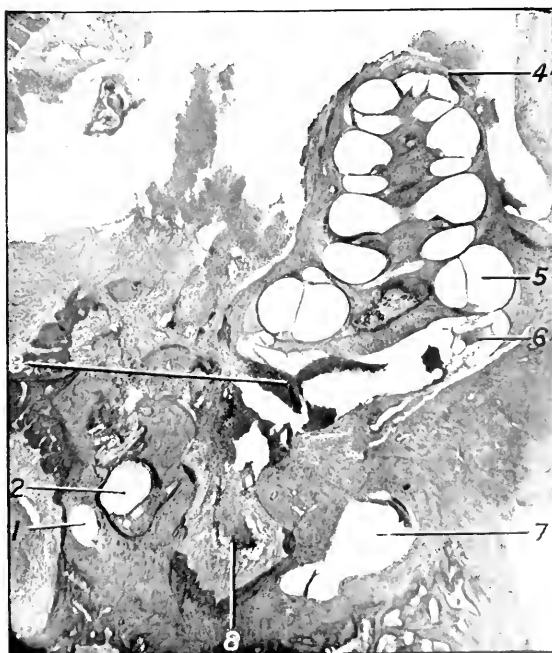
Horizontal section through right ear, showing erosion of apex and outer bony wall of cochlea; infiltration of round window. 1, stapedius; 2, infiltration of round window membrane; 3, pus in tympanic cavity (bulla); 4, erosion of outer bony wall of cochlea; 5, new connective tissue in scala tympani of basal cochlear coil; 6, 7, ampullary end of posterior canal opening into vestibule; 8, facial nerve.

PLATE IX.

FIG. 17.



FIG. 18.



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III. REVIEW OF RECENT LITERATURE CONCERNING THE PATHOLOGY OF TUBERCULAR OTITIS.

General Considerations.

Brieger (Lucae's *Festschrift*, 1905, p. 263) points out that if one only observes cases intermittently and does not follow the course of the disease, one is tempted to look on the stages of the process as different forms of the disease. Brieger's remarks apply not only to the clinical but also to the histological aspect of aural tuberculosis. The various types described may be only stages of the pathological process.

Brieger (*Centralbl. f. Ohrenheilk.*, Bd. xi, p. 273) holds that tuberculosis of the middle ear is, in the great majority of cases, secondary to a tubercular focus elsewhere—generally the lungs. The route of infection is usually by way of the Eustachian tube, though the changes in the tube may be less marked than those in the tympanic cavity. Infection of the middle-ear mucosa may also occur by way of the blood-stream, and Brieger points out that hæmatogenous infection does not always lead to primary localisation in the spongy bone. Middle-ear tuberculosis usually spreads by continuity, and but rarely leaves unaffected those mastoid cells which are guarded by swelling of the mucosa. There are, according to Brieger, four types of tubercular otitis: (1) Lupoid (in case of lupus of neighbouring mucous surfaces), (2) infiltrating, (3) fungating, and (4) necrotic. To these Herzog (*Beiträge für Klinik der Tuberculose*, Bd. vii, Heft 4) adds a fifth—a *fibrinoid form*—in which an exudation occurs on the promontory. The writer in the present paper shows photo-micrographs of still another type, which, in as far as it affects the labyrinth, may be called "fibro-ossifying" (Case 3). The condition is obviously one in which Nature is trying to bring about a spontaneous cure of tubercular otitis interna by a process of fibrosis and ossification. Similar changes, occurring in the tympanum and labyrinth, have been previously demonstrated by Lange (*Passow's Beiträge*, vol. vi, p. 171).

Brieger states that (1) the lupoid form progresses in spurts with intervals of quiet. (2) The infiltrating form may long remain dry, *i. e.*, without exudation (see Jürgen Möller, *Zeitschr. f. Ohrenheilk.*, Bd. lxiv, p. 4). (3) The fungating form in children gives rise to proliferation in the mastoid only. In adults, on the other hand, the whole middle ear is occupied by a profuse formation of tubercular granulation tissue. (4) The necrotic form tends to rapid

caseation and destruction, and to the reactionless melting away of tissue—especially of the bone.

Siebenmann states that in adults the necrotic is twice as frequent as the fungoid form: in children these proportions are reversed. If mixed infection occurs in a case of tubercular otitis the symptoms associated with acute otitis media and mastoiditis are produced, and the presence of a tubercular condition may not be realised.

Henrici (*Zeitschr. f. Ohrenheilk.*, Bd. xlviii, p. 1), records eight cases of tuberculosis of the mastoid. Henrici thinks almost all cases are due to hæmatogenous infection, and that the tuberculosis occurs first of all in the bone.

Goerke (*Passow's Beiträge*, vol. ii, p. 43) holds that hæmatogenous infection in a case of tubercle of the ear can be regarded as proved only when autopsy shows tuberculosis of another organ which has no connection with the ear except the blood stream.

(*Note*.—If a *post-mortem* examination be obtained in a case of tubercular otitis it is advisable to remove both temporal bones in order to study the path of infection. If only one temporal bone can be obtained it is advisable to remove that on the less severely affected side in which only the Eustachian tube may be involved. The naso-pharyngeal tonsil should also be examined in all cases.)

Naso-pharynx.

Hegetschweiler (*Zeitschr. f. Ohrenheilk.*, Bd. xliii, p. 1) records a case of tuberculosis of the ear associated with tuberculosis of the naso-pharynx.

Quix (*Centralbl. f. Ohrenheilk.*, 1911, p. 147) has demonstrated a case of tubercular otitis media and interna in which the tympanic cavity had become infected from the pharynx. The tubercular process had reached the carotid canal, and had spread along this to the base of the brain.

Dallmann and Isemer (*Archiv. f. Ohrenheilk.*, Bd. lxxi) have described a case of tuberculosis of the temporal bone in a patient who had died of general tuberculosis. *Post-mortem* examination showed tuberculosis of the pharyngeal tonsil and of the mucosa of the Eustachian tube.

Brüggemann (*Zeitschr. f. Ohrenheilk.*, Bd. lxxviii, p. 29) records three cases of tuberculosis of the naso-pharyngeal tonsil in adults. In two cases the disease was apparently primary.

Eustachian Tube.

Gradenigo has described a case of lupus of the naso-pharynx which had spread up the Eustachian tube to the tympanic cavity (*Allgem. Wiener. Med. Ztg.*, 1888, Nr. 33). Bondy records a similar case (*Monatschr. f. Ohrenheilk.*, Bd. xliii, p. 24).

Goerke (*Passow's Beiträge*, vol. ii, p. 43) points out that in other diseases of the middle ear the infection passes up the Eustachian tube, and holds that the same thing applies in tubercular otitis. Brieger has shown that in 70 per cent. of cases tubercular adenoids were present.

Haike (*Centralbl. f. Ohrenheilk.*, 1905, p. 294) has recorded five cases of tubercular otitis media in sucklings. In four of these tuberculosis of the mucous membrane of the tube could be followed into the tympanic cavity. In the remaining case there was tuberculosis of the hard and soft palate. In the tubercular Eustachian tubes, Haike found ulcers and also tubercular nodules covered by normal mucous membrane. This is contrary to the condition found in adults, as according to Schwabach, the tube is never in adults the seat of tubercular disease, but only the path of infection.

Bondy (*Monatschr. f. Ohrenheilk.*, Heft 1) states that most authors hold the view that tubercular infection of the middle ear is due to the passage of infectious masses through the lumen of the tube, the walls of which are not infected. Brieger, on the other hand, holds that tubercular foci in the nose or naso-pharynx directly spread along the tube to the tympanic cavity.

Ruttin (*Centralbl. f. Ohrenheilk.*, 1908, p. 613) has demonstrated preparations showing tubercular ulcers of the Eustachian tube in a case of advanced general tuberculosis.

Panse (*Pathologische Anatomie des Ohres*, Leipzig, 1912) states that tubal infection occurs especially in the last stages of phthisis pulmonalis on account of the disappearance of the fatty tissue from the walls of the tube, rendering the tubes very patent and infection of the tympanic cavity more easy during the attacks of coughing.

Carotid Canal.

Goerke (*Passow's Beiträge*, Bd. ii, p. 43) records a case of ear tuberculosis in which histological examination showed that the tubal mucosa was greatly thickened and infected with tuberculosis. The bony tube was quite filled with tubercular granulation tissue, which reached the carotid canal (compare Case 2 of present series, Fig. 7). The bony capsule of the labyrinth was eroded but not

broken through. The marrow spaces at the apex of the petrous pyramid were infiltrated with tuberculosis, and by this route the tubercular process had extended to the dura mater, which was thickened and infiltrated by solitary and confluent tubercles. Goerke holds that the tubercular infection of the tube must have been primary though the patient suffered from tuberculosis of the lower jaw. (See also reference to Quix's case under Nasopharynx.)

O. Mayer (*Centralbl. f. Ohrenheilk.*, 1913) has described a case of tubercular otitis in which the aural discharge showed marked pulsation. Later a severe hemorrhage occurred from the ear and the internal carotid was ligatured. Goerke (*ibid.*) states that judging from experimental, clinical, and anatomical experience, otogenous tubercular meningitis is the rarest of all the cerebral complications of tubercular otitis. The disease spreads to the meninges from the Eustachian tube by way of the carotid canal and not through the labyrinth. Infection *via* the facial canal and direct spread is relatively rare.

Tympanic Membrane.

Jörgen Möller (*Zeitschr. f. Ohrenheilk.*, Bd. lxiv, p. 4) describes a peculiar condition of the tympanic membrane in phthisical patients who complain of tinnitus or deafness. The drumhead is bulged outwards and the malleus lies in a hollow or is quite hidden. The colour of the tympanic membrane is whitish yellow, and the radial vessels are dilated. In some cases necrosis of all the layers of the drumhead occurs. Möller considers that the condition is one of diffuse tubercular infiltration of the mucosa of the middle ear, including the tympanic membrane. This opinion is confirmed by microscopic examination.

Tympanic Cavity.

Habermann (*Schwartz's Handbuch*) divides tuberculosis of the tympanic cavity into (1) acute and (2) chronic forms.

(1) The acute or infiltrating form occurs as a diffuse cellular infiltration of the mucosa. There are few (or no) giant cells, but numerous tubercle bacilli. Extensive caseation and necrosis of the mucosa occurs. This acute form is seen, as a rule, in enfeebled patients in the last weeks of life. (2) The chronic form begins with the formation of circumscribed tubercle follicles in the superficial layers of the mucosa. These follicles show numerous giant cells and but few tubercle bacilli. Caseation occurs in the centre of the

follicle, extends outwards and, when it reaches the surface, results in the formation of superficial ulcers. In the deeper layers the disease spreads by the formation of fresh nodules—apparently due to the spread of the bacilli by the lymphatics. The mucosa may become greatly thickened by proliferation, infiltration, and vascularisation. The formation of new connective tissue may encapsulate the tubercular foci and in rare cases bring about a complete cure. More frequently the disease spreads in superficial area and also in depth, and attacks the ossicle and the walls of the tympanic cavity.

Rebbling (*Zeitschr. f. Ohrenheilk.*, Bd. xlv, p. 138) records a case of primary isolated middle-ear tuberculosis with caries of malleus and incus. The mother of the infant suffered from phthisis, and Rebbling suggests that the infection was due to the mother moistening the tip of the child's bottle with her saliva.

Marcelli (*Centralbl. f. Ohrenheilk.*, 1906, p. 126) has demonstrated a tubercular polypus of the tympanic cavity which microscopically showed all the characters of tuberculosis, except the presence of tubercle bacilli.

Muck (*Zeitschr. f. Ohrenheilk.*, Bd. lviii, p. 64) describes a case of tubercular otitis with polypus projecting from the attic. On section the polypus showed giant cells.

Marriage (*JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, December, 1910) records the case of a bottle-fed baby of three months which had developed a left-sided otorrhœa. The external meatus was occupied by a polypus and the periotic glands were enlarged. At the operation the tympanic cavity was found to be very large, and the polypus was seen to spring from the floor and inner wall. On microscopic examination the polypus showed well marked tuberculosis.

Herzog (*Centralbl. f. Ohrenheilk.*, 1907, p. 531) has examined 108 cases, and found that the median wall of the tympanic cavity was most frequently diseased and that the floor was seldom affected. The malleus and incus are often markedly destroyed, but the stapes long remains intact. Herzog describes a fibrinoid type of tubercular otitis media—the fibrinous layer occurring on the wall of the promontory and lying on a flabby pale red granulation tissue.

Brock (*Centralbl. f. Ohrenheilk.*, 1913) describes a case of tubercular otitis in which the whole middle ear was affected, from the tube to the mastoid. In the tympanic cavity the most marked changes were found in the roof and the floor, where the disease

reached the dura above and the carotid canal below. The tubercular tissue lay mostly under intact epithelium, but a few ulcerating areas were present. The labyrinth windows were intact. Brock describes a second case, in which the tubercular nodules were present to a marked extent in the bony tube and attic, but were sparse in the tympanic cavity itself. The edges of the perforation were covered with epidermis and the squamous epithelium had grown into the tympanic cavity.

Facial Canal.

Brieger (*Centralbl. f. Ohrenheilk.*, 1913, p. 273) states that facial paralysis is most common in the necrotic form of tubercular otitis, rarer in the infiltrating, and still rarer in the fungating form. In the pure lupoid form facial paralysis does not occur.

Bárány ("Report of Austrian Otological Society," *Monatschr. f. Ohrenheilk.*, year 43, vol. viii) reports a case in which there was a very large sequestrum, containing the stylo-mastoid foramen. No trace of any facial paralysis had existed before the operation. The sequestrum also included the whole apex of the mastoid process, as well as the lower and anterior walls of the external meatus. Bárány states that Heine had previously published a case in which, four weeks before the removal of a sequestrum representing the whole of the labyrinth, a reaction to the caloric test was obtained. Bárány believes that the vestibular nerve may still functionate although surrounded by an extensive area of necrotic bone. Neumann holds that the facial nerve is seldom involved, because it is supplied by the stylo-mastoid artery, whereas the labyrinth depends on the internal auditory branch of the basilar. It is thus quite possible that the labyrinth may be widely necrosed while the facial nerve escapes.

Mastoid Process.

Hunter Tod (*JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, January, 1907) records a case of primary tuberculosis of the left mastoid process which appears to have followed an attack of measles. Operation showed that the surface of the mastoid was extensively eroded and that the process was carious and filled with pale soft granulations.

Labyrinth.

Brieger (*Centralbl. f. Ohrenheilk.*, 1913, p. 273) states that labyrinthitis is the most common complication of middle-ear tuberculosis.

Herzog ("Report of the German Otological Society," *Archives of Otology*, 1907, p. 85) has examined the ears of patients suffering from pulmonary tuberculosis, and found that of 100 tuberculous males, seventeen were affected with chronic purulent otitis media, while five of the cases showed labyrinthine involvement.

Kuemmel (*ibid.*) found that labyrinthitis was present in six out of twenty-six cases of tubercular otitis media. Of the six, three belonged to the type of necrosing tuberculosis. According to Siebenmann (*Centralbl. f. Ohrenheilk.*, 1913) labyrinth disease is present in one third of the cases of tubercular otitis media.

Herzog (*Centralbl. f. Ohrenheilk.*, 1907, p. 531) states that labyrinth suppuration occurs in 28.5 per cent. of cases of tubercular otitis. According to Passow (*Centralbl. f. Ohrenheilk.*, 1905, p. 222) the labyrinth is not infected till the stapes is destroyed.

Brieger (*Centralbl. f. Ohrenheilk.*, 1913, p. 273) states that nerve-deafness occurs early in tubercular otitis, and that from the functional point of view the ear is more quickly and severely injured by tuberculosis than by other inflammatory middle-ear diseases.

Ruttin (*ibid.*) states that the reversed fistula symptom is common in tubercular disease. This is due to irregularity of destruction of bone.

Uffenorde (*Centralbl. f. Ohrenheilk.*, 1913, 279, *et seq.*) insists on the need for great care in testing for compression nystagmus (fistula symptom) in tubercular and also in genuine cases.

Blau (*Centralbl. f. Ohrenheilk.*, 1913, p. 273, *et seq.*) has experimented on monkeys, introducing tubercle bacilli through the tympanic membrane. Complete destruction of the tympanic cavity and labyrinth followed; the capsule of the cochlea was softened and rarified. In one case a granulation tissue (tubercular) tumour formed in the cranial cavity.

Haymann (*ibid.*) has experimented on guinea-pigs and monkeys, and found that, on the whole, the results agreed with those seen in men.

Blau (*Centralbl. f. Ohrenheilk.*, 1913, p. 539, *et seq.*) has examined a cat which had been inoculated with tubercular sputum. From the infected ear the inflammation had extended to the meninges by the aqueduct of the cochlea, and had spread up to the cochlea of the other side along the perilymphatic aqueduct.

Langé (*Passow's Beiträge*, Bd. vi, p. 17) gives an account of the microscopic appearances in ten cases of tubercular otitis media and interna. Four of the patients were under three years of age, one

child was aged ten, and the rest of the patients were adults. In all cases *post-mortem* examination showed marked tuberculosis of other parts of the body—lungs, bone, glands, etc. Lange notes that in spite of the difference in the clinical aspect of the cases, the histological picture of tubercular ear disease was very much the same. In all cases the tubercular disease of the mucosa and bone showed the characteristic proliferation and rarefaction, though in some cases caseation and destruction were more pronounced than in others, in which new connective tissue and bone were noted.

The points of entry of the tubercular disease into the labyrinth were as follows: One case, erosion of external canal; one case, oval window; one case, round window; three cases, both windows; two cases, both windows and external canal; in one case the whole inner wall of the tympanic cavity was eroded, and in one case there was no breaking into the labyrinth at the time of death. As Lange points out, the windows appear to be the points of predilection.

With regard to the method of invasion of the labyrinth, Lange points out that the external canal is invaded by erosion of bone, while the same applies to the wall of the promontory. In regard to the windows, Lange also holds that bone destruction occurs first, *i. e.* before the annular ligament is destroyed.

In four of the cases the facial canal was destroyed, and in nine the nerve was infiltrated.

Lange holds that it is difficult to be sure of the presence of mixed infection in cases of tubercular labyrinthitis. If mixed infection be present, one expects to find polymorphonuclear leucocytes in the labyrinthine spaces. Mixed infection may be present in the middle ear and yet the labyrinth may show only tubercular changes. In two of Lange's ten cases mixed infection was probably present. Both of these cases showed the infiltrating and necrotic form of tubercular disease (see Case 2 of the present series).

According to Lange, bone destruction is just as pronounced in those cases where the middle ear shows the proliferating type of tuberculosis as in those where the infiltrating variety is present. The tubercular labyrinthitis corresponds to the type of middle-ear affection which is present.

Tubercular disease spreads into the labyrinth (1) as an inflammatory new formation; this variety is circumscribed and grows into the labyrinth like a tumour, and may even fill the labyrinth spaces. (2) As an exudation in the peri- and endolymph spaces.

If the disease spreads through the windows the perilymph space is most affected.

Dilatation or collapse of the membranous labyrinth was only seen in three cases, and Lange was unable to give any satisfactory explanation, nor does he dogmatise as to changes in the neuro-perithelium and nerves, though he notes that in one case a portion of the vestibular nerve in the internal meatus has been destroyed by tubercular disease.

Changes in the bony labyrinth only occur where the tubercular granulation tissue is in direct contact with the bone. In one case the tubercular disease within the semicircular canals had caused dilatation of the lumen of the bony canal, while in another case the apical coil of the cochlea has become enlarged and the modiolus partially destroyed. There was no excessive necrosis in any case, such as would have been caused by blockage of a large part of the vascular supply of the inner ear. These cases of extensive necrosis occasionally occur in severe purulent (non-tubercular) labyrinthitis, and are due to the destruction of the labyrinthine artery in the internal meatus. Lange holds that such conditions may arise in tubercular labyrinthitis, and two of his cases show the initial stages of such a change.

Formation of new bone in the labyrinth in cases of tubercular labyrinthitis may fill up defects caused by the disease. In some cases the tubercular disease in the labyrinth may break through from within outwards, and so give rise to real fistulae.

Lange observed that the paths of infection between the labyrinth and the endocranium were remarkably free from tubercular disease, *i. e.* the ductus and saccus endolymphaticus, the ductus perilymphaticus, and the internal auditory meatus. In only one case was the lower branch of the vestibular nerve in the internal meatus affected by tuberculosis.

In none of Lange's ten cases had the labyrinth tuberculosis led to a fatal result. Four of the cases had died of general and five of pulmonary tuberculosis. In the remaining case the tuberculosis of the petrous bone had caused tubercular meningitis and tubercular tumour of the cerebellum, but the infection had not passed through the labyrinth. Lange believes that tubercular labyrinthitis is not more likely to cause a tubercular intra-cranial complication than is tubercular otitis media.

In only two of the ten cases was there any attempt at a healing process, and then only in a partial manner. In one case microscopic examination showed that the middle ear was filled with loose

connective tissue containing a few tubercles, and was quite shut off from the external meatus. In only one spot was there a large mass of tubercular granulation tissue, while the inner wall of the middle ear showed a thick layer of new bone. In spite of these favourable appearances in the middle ear, there was active tuberculosis in the labyrinth.

Lange (*Centralbl. f. Ohrenheilk.*, 1905, p. 491) reports a case of isolated tuberculosis of the mastoid. The onset was acute, but after the Schwartz operation healing was slow and so the radical operation was performed. The nature of the disease was then recognised, and it was found that the labyrinth was involved, although there had been no labyrinth symptoms with the exception of slight nystagmus. [The writer (J. S. F.) has recently operated on a case of purulent otitis media of two years' duration, in which there is tuberculosis of the soft palate and naso-pharynx. Functional examination showed that the labyrinth had lost its functions (cochlear and vestibular), and yet there have been no symptoms of an attack of labyrinthitis. It appears that tubercular labyrinthitis, like tubercular otitis media, has a "quiet onset."]

Nakamura (*Centralbl. f. Ohrenheilk.*, 1911, p. 559), as a result of microscopic examination, holds that tubercular otitis spreads to the labyrinth through the round window.

Brieger (*vide supra*) does not appear to believe in the induced form of tubercular labyrinthitis, and holds that one must cut and stain serial sections in order to be sure that there has been no perforation of the annular ligament.

Tubercular Neuritis.

Habermann (*Zeitschr. f. Ohrenheilk.*, Bd. lxxi, p. 288) states that as a rule tuberculosis affects the labyrinth from the middle ear either by extension through the windows or by erosion of bone. Habermann records the case of a female, aged twenty, who had suffered from influenza with headache and vomiting and pain at the back of the neck. Tinnitus and giddiness came on, and gradual loss of sight with typical choked disc.

Physical examination showed tuberculosis of right lung. Rhombergism was present, and the gait very uncertain. The right drumhead was thickened, but the left normal. Functional examination showed deafness in both ears; obstructive deafness on right side. Later facial paralysis developed on left side along with weakness of right leg. Within three days the patient became quite deaf.

Autopsy showed a tubercular tumour of the right cerebellar lobe; the cortex of the right cerebral hemisphere was infiltrated with tubercle. Internal hydrocephalus and œdema of brain were present.

Microscopic examination revealed tubercnlosis of the right tympanic cavity with exudate in round window niche and in scala tympani of cochlea just above it. The internal meatus showed inflammatory infiltration between the nerve bundles extending to the modiolus and endosteum of scala tympani. Tubercles were present in the ampullæ, cristæ and epithelium of saccule and utricle. The left inner ear showed a slighter degree of affection and the middle ear was almost normal. Habermann thinks *the tubercular otitis interna was due to breaking down of the tubercular tumour in the cerebellum, which allowed the bacilli to gain entrance to the cerebro-spinal fluid, and so reach the internal auditory meatus on both sides and infiltrate the cochlear and vestibular nerves.* Habermann admits, however, that a blood infection cannot be excluded. The optic fundus on both sides showed a condition analogous to that of the inner ear.

Siebenmann (*Zeitschr. f. Ohrenheilk.*, Bd. xliii, p. 216) records a case of retro-labyrinthine neuritis with, as he holds, persistence of embryonic connective tissue in the scala tympani of the basal coil. It is interesting to note that functional examination of Siebenmann's patient, aged fifty-one, showed nerve deafness. At the *post mortem* the acoustic nerves were normal on naked-eye examination. Microscopic examination showed that the mucosa of the middle ear was swollen and infiltrated, especially in the niche of the round window. In addition to the lesion in the basal coil of the cochlea, the nerve in the internal meatus was infiltrated with fibrous tissue, and in the modiolus the nerve-fibres and ganglion cells were reduced in number. Siebenmann compares the findings in the nerve to those present in cases of optic neuritis. The case in some ways corresponds to Case 3 recorded in the present paper, and the condition appears to the present writer to be one of tubercular invasion of the scala tympani of the cochlea through the membrane of the round window, rather than one in which foetal connective tissue had persisted in the scala tympani of the basal coil of the cochlea. If this view be correct it is easy to account for the infiltration of the cochlear nerve in the internal meatus as the result of chronic inflammatory (tubercular) changes which have spread from the basal coil to the cochlear nerve and ended in the formation of fibrous tissue (interstitial neuritis).

Wittmaack (Abst., *Centralbl. f. Ohrenheilk.*, 1903, p. 446) has demonstrated microscopic preparations of acoustic neuritis due to tubercle, with preponderating participation of the cochlear nerve and spiral ganglion.

Dura Mater.

Poli (*Centralbl. f. Ohrenheilk.*, 1903, p. 484) states that the dura mater is very resistant to tubercular infection. As a rule only the outer layer of the dura is involved. In cases in which the inner layer is diseased there is mixed infection through the sinus. On account of the resistance of the inner layer of the dura the spread of a tubercular process to the interior of the skull is rare, and is almost always due to infection by way of the blood-stream.

Brieger (*vide supra*) holds that the dura may be affected by pachymeningitis interna as well as by pachymeningitis externa.

Pia Arachnoid.

Landois (*Deutsch. Med. Wochen.*, 1907, p. 9) states that tubercle of the pia mater is usually in the form of miliary nodules, and more rarely in that of large solitary tubercles. The rarest manifestation is a circumscribed focal inflammation of the pia over the convexity—usually in the motor cortical centres. The pia is much thickened and shows, especially around the vessels, tubercles which tend more to cicatrization than to caseation. The membranes of the brain adhere and join with the cortical layer of brain. The tubercular scar-tissue fills up the sulci. After the blocking of the pial vessels the brain substance becomes destroyed and the new tissue passes deeper into the brain. Only then do symptoms appear—paralysis, epilepsy (Jacksonian), or general epilepsy.

Brieger states that purulent lepto-meningitis may be due to a labyrinthitis caused by a middle-ear tuberculosis which has become secondarily infected.

Panse (*Centralbl. f. Ohrenheilk.*, Bd. xi, p. 273, *et seq.*) holds that many cases of tuberculosis of ear combined with tuberculosis of the meninges are of hæmatogenous origin.

Sigmoid Sinus and Jugular Bulb.

Lübbers (*Passow's Beiträge*, Bd. v, p. 317) records the case of a man who suffered from an acute exacerbation of otitis media. At operation there was severe destruction of the mastoid, and the sinus was covered with granulations. Later, rigors developed and a second operation showed tubercular thrombosis of the sinus

(microscopic examination). Still later, there were glandular abscesses in the neck and meningitic symptoms. The *post-mortem* showed primary tuberculosis of the left temporal bone with tubercular sinus phlebitis and meningitis, but no miliary tuberculosis. The Eustachian tube and naso-pharynx were not affected and the labyrinth was normal, but the carotid canal was infiltrated with tubercle from the bulb of the internal jugular vein. Lübbers considered that the case was one of hæmatogenous infection.

Van Caneghem (*Centralbl. f. Ohrenheilk.*, 1912, p. 393) has demonstrated a case of tubercular infiltration of the jugular bulb in a case of tubercular otitis. He holds that this is a possible source of general infection.

Voss (*Centralbl. f. Ohrenheilk.*, Bd. xi) has had one case of sinus and one of bulb thrombosis out of sixteen cases of tubercular ear disease.

Tuberculosis of the Brain.

Brieger (*Centralbl. f. Ohrenheilk.*, 1913, p. 273) states that the connection of brain tubercle with middle-ear tuberculosis is uncertain, but that brain abscess may occasionally be due to tubercular otitis media.

Scheibe (*ibid.*) holds that the danger of the spread of tubercular middle-ear disease to the brain is very small.

Krepuska (*Centralbl. f. Ohrenheilk.*, 1903, p. 268) records a case of tubercular otitis media in a child, aged eight. At the *post-mortem* there were solitary tubercular tumours of the cerebellum, left optic thalamus, corpus striatum, and left uncinate gyrus. Tubercular basal meningitis was also present with acute hydrocephalus. In this case neuro-papillitis and choked disc were present, a condition which Krepuska had not observed in seven cases of brain abscess due to other causes.

Schulze (*Archiv f. Ohrenheilk.*, Bd. lix) has collected nine cases of suppurative otitis media combined with tubercle of the brain and adds two original cases. In only one of these was the ear condition of a tubercular nature. Schulze states that tubercular tumours of the brain are usually situated in the cerebellum, the great ganglia or the cerebral peduncles. If the symptoms point to affection of these regions we must think of tubercle.

Busch (*Centralbl. f. Ohrenheilk.*, 1912, p. 259) records a case of tubercular otitis in a child, aged three. Antrectomy and a radical operation had already been performed, but the wound had not healed. The posterior meatal wall and incus were carious. A

fourth operation revealed tubercular disease of the dura and a fistula into the cerebrum. The case recovered. This case suggests two points: (1) If a case fails to heal after a mastoid operation, tuberculosis may be present; (2) at operation on a tubercular case it is advisable to expose the dura of the middle and also of the posterior fossa as widely as possible. The dura is a far more efficient barrier than bone against the spread of tuberculosis.

SUMMARY.

(1) Cases of tubercular otitis media may be divided into two groups: (a) Tubercular otitis in infants and young children who have been fed in whole or in part on unsterilised cow's milk which contains tubercle bacilli. The frequency of tubercular otitis media in infants and young children as compared with other forms of otitis media is very remarkable. Our statistics show that under the age of two years 27 per cent. of the cases of purulent otitis media are due to tuberculosis, while under one year 50 per cent. of the cases are due to tubercular disease. On the other hand, if we take cases of otitis media at all ages, we find that tubercular otitis only accounts for 2·8 per cent. of the cases. We have not as yet obtained proof that these infantile cases are due to the bovine type of tubercle bacillus, but if we may reason from the analogy of the work done by John Fraser on tubercle of bone, and by Philip Mitchell on tubercular adenitis and on tubercular contamination of the Edinburgh milk supply, we think it is extremely probable that the great majority of our infantile cases are due to the bovine bacillus introduced into the system by the drinking of unsterilised cows' milk.

(b) The second type of tubercular otitis media occurs in the advanced stages of phthisis pulmonalis. Statistics as to the frequency of tubercular otitis media in consumptives vary very greatly. StClair Thomson only found two cases of tubercular otitis among seven hundred patients suffering from pulmonary tuberculosis, whereas Herzog found chronic purulent otitis media in seventeen out of one hundred cases of consumption; five of the seventeen cases showed labyrinthine involvement. The writers have examined five cases of purulent otitis media occurring amongst one hundred and twenty cases of phthisis pulmonalis (mostly of the advanced stage) at the Edinburgh Fever Hospital. In only one of these five cases was there any suspicion of middle-ear tuberculosis.

(2) The route of infection in tubercular otitis media is still a matter of dispute. It is generally agreed, however, that there are two possible routes: (a) By way of the Eustachian tube, and (b) by the blood-stream.

(a) The infection may pass by the Eustachian tube either (1) by tubercular infiltration of the mucous membrane lining the tube, spreading up to the tympanic cavity and mastoid antrum. Ulceration of the surface is usually present. This mode of infection is probably the usual one in infants, and is frequently associated with tubercular disease of the mucous membrane of the naso-pharynx, including Luschka's tonsil. (2) The tympanic cavity may become infected by tuberclosis by the insufflation of infectious particles through the Eustachian tube during the acts of coughing, sneezing or vomiting. This is said to be the usual mode of infection in advanced cases of phthisis pulmonalis and is predisposed to by the absorption of the fatty tissue in the walls of the Eustachian tube, rendering the tubes more patent than normal. Infection of the tympanic cavity by this method is also quite possible in infants and young children who have wide, straight, Eustachian tubes. Microscopic investigation of the Eustachian tubes in infants and young children dying of tuberclosis (abdominal or respiratory), and of adults dying as the result of phthisis pulmonalis, would be of great value in clearing up the question of the route of infection. Further, the microscopic examination of adenoid post-nasal growths removed from infants and young children who have been fed on unsterilised milk would be of great interest in this connection.

(b) Henrici and others hold that tubercular otitis is often due to a hæmatogenous infection, but it is not easy to be sure that the middle ear has been infected by this route. If, however, it can be shown at operation that the tube and tympanum are healthy, and that the mastoid alone is diseased, the probability is that the infection has occurred by way of the blood-stream. Definite proof can only be obtained by *post-mortem* investigation. If we may reason on the analogy of ordinary purulent otitis media, we must come to the conclusion that the route of infection is probably *via* the Eustachian tube.

(3) Types (or stages) of tubercular otitis media and interna. Brieger describes four types of tubercular disease of the middle ear and labyrinth: (a) Lupoid—in cases of lupus of the nose and throat. (b) An infiltrating form which progresses rapidly and shows numerous tubercle bacilli, but few giant cells. (c) A fungating or more chronic form with well marked tubercle follicles

and few bacilli. In this variety the mucosa is greatly thickened and may form polypi. There is a distinct tendency towards encapsulation of the tubercle follicles and spontaneous cure of the condition. (*d*) A necrotic form which tends to rapid caseation and destruction of the mucosa and also of the bony capsule of the labyrinth. The exact cause of the necrosis is not quite certain. It may be due to blocking of one or more of the arterial twigs supplying the labyrinth capsule by tubercular endo- or periarteritis, but mixed infection is probably of even greater importance. (*e*) Herzog describes a fibrinoid form of tubercular otitis media, in which a false membrane occurs on the tympanic mucosa. (*f*) In the present paper we show that a fibro-ossifying type of tubercular otitis interna may occur, *i. e.* a type in which Nature makes considerable effort towards a spontaneous cure of tubercular labyrinthitis by the formation of new fibrous tissue and bone. This type of tubercular disease is well recognised in the case of the long bones.

It is not certain what factors determine the type of tuberculous otitis present in a given case, but the following considerations are probably of importance: (i) the type of tubercle bacillus present; (ii) the resisting powers of the patient; (iii) the route of infection (tubal or hæmatogenous); (iv) the presence or absence of mixed infection.

(4) Clinical characteristics of tubercular otitis: (*a*) The age-incidence and (*b*) the question of feeding have already been mentioned. (*c*) The onset of the otitis was painless in 92 per cent. of our cases. (*d*) Enlarged periotic glands were present in 95 per cent. of the cases. (*e*) The discharge from the ear is watery or flocculent—at least in the early stages before mixed infection occurs. (*f*) Facial paralysis was present in 45 per cent. of our cases. (*g*) Multiple perforations in the drumhead may be observed in adults in whom the membrane can be inspected, but in infants the sagging of the meatal wall usually prevents inspection of the tympanic membrane. (*h*) If mixed infection occur in a case of tubercular otitis, the symptoms of an acute otitis media and mastoiditis may arise.

(5) Involvement of the labyrinth in cases of tubercular otitis media is frequent and occurs early. The percentage varies from 23 (according to Kuemmel) up to 33 per cent. (according to Siebenmann). Our statistics show that labyrinth necrosis was present in 22 per cent. of the cases operated on, while in a further 31 per cent. there was erosion of the labyrinth wall. If we add

these two groups together we get a total of 53 per cent. Friedrich has shown that labyrinthitis occurs in only 1 per cent. of cases of ordinary suppurative otitis media.) In infants and very young children, the ordinary tests of the labyrinth function can hardly be applied, but if the radical mastoid operation be performed it is possible, at the end of the operation, to apply cold lotion to the inner wall of the operation cavity, and the anaesthetist is able to observe whether or not this procedure results in conjugate deviation of the eyes to the lower or non-operated side.

Infection spreads to the labyrinth from the middle ear as a rule by way of the oval or round windows. The stapes footplate is soon eroded, but the endostem lining the vestibule resists, and is pushed inwards in front of the mass of tubercular granulation tissue before rupture occurs and the perilymph space of the vestibule is invaded. Invasion of the labyrinth through the secondary tympanic membrane is not resisted to the same extent, and "induced" labyrinthitis may occur in this region, *i.e.* infection of the perilymph space of the scala tympani of the basal coil without any actual perforation of the round window membrane. In such cases it is possible for infection of the cranial subarachnoid space to occur by way of the cochlear aqueduct, but clinically we do not meet with tubercular meningitis originating in this way. The prominence of the external semicircular canal is occasionally the seat of a fistula into the labyrinth, but not nearly so often as in cases of cholesteatoma. On the other hand, the promontory is much more often diseased in tubercular than in simple purulent otitis media.

Clinically, tubercular labyrinthitis, like tubercular otitis media, appears to have a quiet onset. This is in marked contrast to the violent symptoms produced by an acute purulent (manifest) labyrinthitis.

(6) The results of animal experiments as carried out by Blan, by Heymann, and also by one of the writers, agree with the findings in human subjects. They show that tubercular otitis is more severe than ordinary purulent otitis media, that the labyrinth is more often involved, and that the invasion of the labyrinth occurs by way of the windows.

(7) The diagnosis of tubercular otitis is made by attention to the following points: (a) Clinical characteristics already mentioned. (b) The findings at operation. (c) The examination of the ear discharge for tubercle bacilli by staining films with carbol fuchsin in the usual way and then decolorising with sulphuric

acid in alcohol. This method eliminates those organisms which are acid-fast, but not *acid- and alcohol-fast*, as is the tubercle bacillus. (d) Microscopic examination of the "granulations," or rather of the swollen and infiltrated mucosa of the middle-ear cleft. (e) Subcutaneous inoculation of the discharge from the ear or of tissue obtained at operation into the groin of a guinea-pig. In order to get rid of mixed infection the tissue may be treated with anti-formin or ericolin before inoculations are carried out. (f) In order to determine whether the tubercular otitis is due to the presence of the bovine or of the human type of tubercle bacillus it is necessary to make cultures on egg medium from the tubercular lesions in the guinea-pig, and later to inject rabbits. (For fuller information on this subject the reader is referred to "Tuberculosis of the Bones and Joints in Children," by John Fraser, F.R.C.S.E., etc., Assistant Surgeon, Royal Hospital for Sick Children, Edinburgh. A. & C. Black, 1914.)

(8) Complications: Tubercular otitis media does not appear to give rise to serious intracranial complications to any marked extent, though tubercular pachymeningitis externa is frequently met with at operation. Cases are, however, on record of hæmorrhage from the internal carotid artery, and of tubercular thrombosis of the sigmoid sinus as the result of tubercular otitis media. The question of tubercular labyrinthitis has already been dealt with. Tubercular meningitis and tubercular tumours (or abscess) of the brain—affecting usually the cerebellum and the large basal ganglion—are met with at *post-mortem* examinations on cases operated on for tubercular otitis, but they are usually regarded as parts of a general tuberculosis and not as the direct result of tubercular otitis media and interna. Brieger states that purulent leptomeningitis may be due to a tubercular otitis media and interna which has become the seat of secondary infection.

(9) In the experience of the writers the prognosis of tuberculous otitis media is not favourable. Some writers, however, claim a high percentage of cures.

(10) Treatment: Brieger holds that the indications for treatment of tubercular otitis are the same as those in the ordinary purulent forms of otitis media and mastoiditis. Ruttin, on the other hand, has informed one of the writers that in Vienna they only operate on tubercular otitis if the patient is suffering severe pain, as they consider it hopeless to get rid of all the disease. Probably the correct position lies between these two extremes. If the patient be suffering from advanced phthisis pulmonalis, or

tubercular meningitis, operation is contra-indicated unless the ear condition is giving rise to severe pain.

If the infection, as is generally held, comes by way of the Eustachian tube, it is useless to perform a Schwartz operation. The radical operation is therefore indicated in all cases except in those rare forms in which there is an apparently hamatogenous involvement of the mastoid process. At the radical operation it is advisable to expose freely the dura of the middle and posterior fossæ, because this membrane forms a much better barrier than the bone to the spread of tubercular disease. Even after the radical operation has been performed, one can only curette the Eustachian tube from the mastoid wound, and, at a later date, remove tubercular adenoids if they be present. It is therefore not possible to get rid of the whole of the disease, so that one must depend to a great extent on the resistive powers of the patient, and for this reason it is very important that sanatoria should be provided for the after-treatment of the surgical forms of tuberculosis. It is useless to send these cases of tubercular otitis back to the slums from which so many of them come.

The writers believe that Pfannenstiel's method of treating tuberculosis of the nasal mucous membrane may be applied with advantage in the after-treatment of tubercular otitis media. Sodium iodide is given internally in increasing doses, and the operation cavity is packed with gauze soaked in peroxide of hydrogen.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE--OTOLOGICAL SECTION.

February 19, 1915.

DR. ALBERT A. GRAY, *President of the Section, in the Chair.*

DISCUSSION ON TUBERCULOSIS OF THE AUDITORY APPARATUS.

(For introductory papers see p. 209.)

Specimens exhibited by Wyatt Wingrave, M.D.

- (1) Tubercle bacilli in discharge. Stained by picro-fuchsin method.
- (2) Acid-fast bacilli in discharge, simulating *Bacillus tuberculosis*.

- (3) Acid-fast bacilli in atrophic rhinitis.
- (4) Giant cells of tuberculoma.
- (5) Giant cells of non-tubercular granuloma.

Specimens of Tuberculosis of the Temporal Bone.—Arthur Cheattle.—(1) Right temporal bone of an infant, who died of general tuberculosis: Tuberculosis of the lining membrane of the middle-ear tract. Through a perforation in the posterior segment of the membrane the lining membrane is seen to be thick and nodular. The middle-ear tract, including the anterior, contained cheesy pus. The vessels are intact. Sections of the lining membrane, stripped off the external semicircular canal, show tuberculosis. See next specimen. (89.1, Royal College of Surgeons Museum.)

(2) Drawing of a microscopical section of the lining membrane from the preceding section, showing tuberculosis. (89.11, Royal College of Surgeons Museum.)

(3) Left temporal bone of an infant, who died of general tuberculosis: The middle-ear tract wall full of brown pus. Complete loss of the membrane and of the neck, short process and handle of the malleus and articular process of the incus. The stapes is in position. There is caries of the promontory over the round window. The interior of labyrinth was not invaded. (90.1, Royal College of Surgeons Museum.)

(4) Right temporal bone of an infant who died of general tuberculosis: An operation has been performed. The external canal and Fallopian canal are opened by the disease. The promontory is rough and carious, and the round window is irregularly enlarged. The stapes has been lost. (91.1, Royal College of Surgeons Museum.)

(5) Left bone of an infant who died of general tuberculosis: An operation has been performed. The external canal is carious. The promontory is carious and perforated. The whole labyrinth was invaded, and secondary perforations have occurred through the superior semicircular canal to the middle fossa, and through the posterior semicircular canal to the posterior fossa. (92.1, Royal College of Surgeons Museums.)

Cases illustrating Tuberculosis of the Ear, shown after Operation.—W. Stuart-Low.—*Case 1.*—A child, aged one. Operated upon on November 30, for septic mastoiditis. Family history of tuberculosis on mother's side. The child had profuse discharge since August, and there was marked absence of pain. The points of the operation were an extensive cortical mastoid operation, previous to which the discharges were very effectively removed from the meatus by means of suction by the exhibitor's vacuum suction pump, which apparatus was also used at the time of the operation to suck up blood and purulent discharge in the interstices of the bone. The whole of the excavated surface was then freely swabbed out with a solution of chloride of zinc (40 gr. to the ounce), and the wound was left open and only lightly packed with sterile gauze. In the after-treatment the suction method was also employed both in the meatus and in the cavity of the wound.

Case 2.—A child, aged eighteen months. Operation four months ago for profuse discharge in the ear and also tenderness and swelling over the mastoid. Tubercle bacilli were found in the discharge, and extensive caries of the bone discovered on operating. A very thorough cortical mastoid operation was performed, preceded by repeated suction of the meatus by means of the same apparatus as mentioned in the first case. A solution of chloride of zinc was applied also in this case, and in the

after-treatment the discharges were got rid of by the employment of the suction apparatus each time the case was dressed.

Tuberculosis of the Auditory Apparatus treated by Permanent Drainage of the Lateral Ventricle.—C. E. West.—L. G.—, female, aged two and a half, was admitted to hospital on May 23, 1914, with a history of pain and discharge occurring from the left ear on May 12, and left facial paralysis on May 19. There was complete left facial paralysis. On the right side a radical mastoid operation had been carried out elsewhere in February, 1914. There was a continued discharge from this ear, and the lymphatic glands in both anterior triangles of the neck were enlarged. A few days later an extensive radical mastoid operation was performed on the left side. The tympanic part of the facial nerve was found to be completely lost in a mass of soft granulations, and the whole of the region of the labyrinth was crumbling, and the jugular bulb was exposed. The child was very collapsed at the end of the operation. Early in July a facio-hypoglossal anastomosis was carried out on the left side. This had had no effect on the paralysis. About July 25 there was a sudden complete right hemiplegia, with the general signs of a chronic meningitis, squint, retraction of the head, and unconsciousness. These features gradually passed away, but the hemiplegia continued with only slow improvement. The right facial paralysis continued complete. On September 30 the left mastoid cavity was curetted out and a small sequestrum was found and was removed. The right cavity was also curetted. On October 19 the voice became feeble and husky, and on October 20 the child had a prolonged attack of crying followed by convulsions, mostly right-sided, and unconsciousness. The convulsions subsided only after administration of chloroform, and recurred in a milder form later. Next day the child was much better. A large temporal flap was turned down and the whole of the squama was removed on the left side. When the dura mater was turned down the leptomeninges were found to be intensely cedematous and a large quantity of cerebro-spinal fluid ran away. The brain bulged strongly through the opening. In the posterior part of the exposed area the cortex appeared of normal colour, but anteriorly, over what would represent the lower part of the motor area, the colour was blue, and there was clearly some kind of cyst. This was punctured and was found to be an enormously dilated lateral ventricle. The fluid was allowed to run away slowly, the dura mater replaced but not sutured, and the scalp wound closed. On the next day the child was sitting up, taking food, and quite lively. The wound healed absolutely well, in spite of much tension and bulging. The bulging continued, and gradually became more tense. On November 3 there was a recurrence of the fits. On November 11 the child was once more anaesthetised, and the scalp bulge was pierced by a long needle armed with No. 3 twist silk, the needle being passed right across the bulge and brought out through the skin some 2 in. beyond the edge of the old incision. Both ends of the silk were buried. One such line passed from above and behind downwards and forwards, emerging in the parotid region: two others led upwards into the parietal region. There was an immediate and remarkable passage of fluid along the threads, producing an obvious oedema. The child again had no disturbance, but the amount of fluid passed continued so large that on November 18 the left eye was still almost closed by swelling. This has gradually subsided. Since that date the child's general health had been excellent.

Bacteriology: The material from the original operation was kindly

worked out by Dr. Eastwood. Typical tuberculous lesions were produced in guinea-pigs, and inoculation experiments on rabbits showed that the type of tubercle bacillus was "human." Two other cases of tuberculosis of the petrous similarly worked out have proved to be of the bovine type.

Tuberculosis of the Auditory Apparatus in Children.—E. D. Davis.—A little girl, aged one and three-quarters, was brought to hospital with right otorrhea and caseating posterior, auricular, and deep cervical glands on the same side. A radical mastoid operation was performed twelve months ago, and at the same time the infected glands were removed. The glands proved to be tuberculous. The child made an uninterrupted recovery, and all the disease has been arrested. The operation area rapidly healed and has remained sound ever since.

A Post-mortem Specimen of a Radical Mastoid Operation performed Six Months before Death to illustrate Secondary Auditory Tuberculosis in an Adult. — E. D. Davis.—The patient was a comedian who had, for some years, suffered from pulmonary tuberculosis. During sanatorium treatment he developed mastoiditis and facial paralysis, following chronic otorrhea. At the time of the radical mastoid operation he was suffering from advanced laryngeal and pulmonary tuberculosis. The mastoid process was extensively involved, and in removing the focus of disease a large area of the dura mater of the middle fossa was exposed. The post-aural wound healed by first intention, and the patient left the hospital after ten days with the symptoms relieved and health improved. When seen about four months before death the mastoid cavity was satisfactory.

The *post-mortem* showed extensive laryngeal, pulmonary, and intestinal tuberculosis. The middle fossa dura mater was thickened, and the exposed area covered by tuberculous granulation tissue. The petrous bone below the dura and surrounding the opening made at the operation was necrosed. The brain was normal and the meninges, apart from those in immediate relation to the area of operation, were unaffected.

A histological specimen of the granulation tissue stained for tubercle bacilli was shown.

The PRESIDENT (Dr. ALBERT A. GRAY) said he always felt in some difficulty when the diagnosis of tuberculosis of the ear was in question. He admitted he occasionally judged a case by the result; if it got better he concluded that was, on the whole, against the idea of tuberculosis. He, therefore, hoped to learn much from this debate.

Dr. WYATT WINGRAVE said that the pathologist's share in the diagnosis of tuberculosis of the ear was mainly concerned in the examination of discharge and of curettage material. In the discharge one naturally looked for tubercle bacilli. This was often disappointing as compared with sputum, for they were rarely seen except in acute cases. In chronic cases, however, the discharge frequently presented acid-fast bacilli which had a striking resemblance to tubercle bacilli, and unless carefully stained and critically examined might lead to mistakes. They differed from tubercle in readily yielding the fuchsin to alcohol after differentiating in H_2SO_4 . In shape they varied considerably; some bore a striking resemblance to tubercle, while others might be thick or thin, long or short, massed, felted, fasciculated, or discrete. Further, they grew readily on agar, but lost their acid-fast property. They were not

"colour-true"—*i. e.* they were apt to take up the counter-stain. In aural disease associated with atrophic rhinitis they must be specially looked for, as they were the most prominent and persistent organisms in this affection. In curettage material perhaps more reliable evidence was found, since giant cells or bacilli were easily seen, whereas in discharges giant cells were uncommon. One must be careful to distinguish between the genuine giant cell and the large multinucleated (syncytial) cell so often present in non-specific granulomata involving the bone (peri- and endosteal). Giant cells were very common in chronic tuberculosis, but rare in acute, exactly the reverse of tubercle bacilli, which were extremely rare in chronic cases. So much so that it was a working rule that in chronic tuberculous giant cells were +, bacilli —; *acute* tuberculosis, giant cells were —, bacilli +. Instances of primary tuberculosis seemed specially to select the meatus, probably the result of direct digital infection, since several specimens of curettage from meatal granulomata contained tubercle bacilli. It was rare to find the normal character in the discharge: instead of being "watery and cordy" it was far more frequently "creamy" or purulent, owing to the superadded "pyogens."

To ensure accuracy in the differential diagnosis of bacilli it was safer to use the picro-fuchsin method in preference to the Ziehl-Neelsen, which, unless very thoroughly and scrupulously followed, was unreliable. He now used the picro-fuchsin as a routine stain, it being easier to employ and facilitating search. The ear was not the only organ which sometimes failed to afford a positive diagnosis of tubercle, of which there might be very little doubt clinically, and in suspected primary cases von Pirquet's or other tuberculin tests were specially called for when bacilli were not found in either the discharge or the curettage. In chronic tuberculosis of the ear tubercle bacilli were found in 16 per cent. of the cases; in acute, 87 per cent.

[*Note.*—Simplified picro-fuchsin method: Substitute saturated alcoholic solution of picric acid for water solution of methylene blue. Wash freely before staining by fuchsin and after the acid bath.]

MR. ARTHUR CHEATLE said that the series of specimens he showed demonstrated the spread of tuberculous disease through the temporal bone in infants. The first showed tuberculous disease of the lining membrane; the second, implication of the ossicles and promontory; the third, perforation of the outer labyrinthine wall and facial canal, and exterior to the dura mater of the middle fossa; the other showed implication of the labyrinth, while the last showed re-perforation of the labyrinth through the superior and posterior semicircular canal to the dura mater of the middle and posterior fossae. He thought the cases of tuberculosis of the temporal bone in infants were generally bovine in origin, and related a typical case which had been investigated by Dr. Eastwood, who reported: "The discharge on the dressing was extracted with saline and inoculated into a guinea-pig, which subsequently developed tuberculosis. From the guinea-pig a culture was obtained which, on being tested upon differential glycerine-bed media, exhibited the scanty growth typical of the bovine bacillus. Inoculated into a rabbit, the culture produced fatal generalised tuberculosis, which is also typical of the bovine bacillus." He believed the infection was due to milk, and occurred through the Eustachian tube. He said tuberculosis of the temporal bone in adults with lung tuberculosis ran an entirely different course. This might be due to two reasons: a different organism or different anatomical condition of the bone, for there were very few adult bones in which the diploë could be attacked

in the way which was so typical of the disease in infants' bones, in which the diploë was so open to attack. In adult tuberculosis with lung affection he had seen healing of the middle-ear infection under antiseptic treatment, but with very dense adhesions and greatly diminished hearing.

Mr. C. E. WEST said he only brought forward the case he had shown because he was asked to contribute something to the meeting, and it was something of a surgical curiosity. The method adopted to permanently drain the lateral ventricle had been a complete success. Mr. Cheatle's remarks had stimulated him to refer to one or two points. He, like others, had seen undoubted cases of tubercular infection of the ear in adults get well; but he had very rarely seen tuberculosis of the middle ear, in adults or in children, get well after they had suffered extensive loss of membrane and serious secondary infection. He agreed with Mr. Cheatle that the typical behaviour in an adult differed from that in the child; and one asked oneself why that should be. He had been inclined to imagine that Mr. Cheatle's explanation was a good one. He also had been having his cases followed up by Dr. Eastwood, and of the three cases he had had recently of proven tuberculosis—and only proven cases should have any weight—in children, two were typically bovine, the other, which he showed on this occasion, with tuberculous disease of the petrous bone and extensive destruction and invasion of the labyrinth, was human tuberculosis. Therefore he did not think one could ascribe very much weight to the type of the bacillary infection in determining the clinical type: it seemed, rather, a question of soil and seed: a matter of the degree of resistance of the individual. In children, as it usually ran an acute course in them, there was destruction of the membrana tympani, and the difficulty of the exclusion of secondary infection was enormously augmented in the case of children, compared with adults, because children put their fingers into their ears after the fingers had been in all kinds of places and orifices of the body, so that there was usually a very mixed infection. On comparing cases of tuberculosis of the petrous bone with those of tuberculosis of the hip-joint, it would be seen there was a tremendous difference in the ordinary prospects of recovery. He believed that the essential point was the presence of secondary infection. The majority of the cases in adults which he had seen recover had had no perforation; he had never seen a chronically open case of tuberculosis of the ear in an adult recover. He did not think there was any surgical progress in recent years in reference to tuberculosis of the petrous bone. If the child's resistance was good it might recover, but not otherwise. The line which he believed the future would show was some more effective way of dealing with the bacteriological side of the question—the increasing of the immunity reaction.

Mr. E. D. DAVIS said the little girl he showed was a typical case of tuberculosis of the mastoid, with enlarged glands in the neck. It was one of the five cases whom Major Waggett and he had had at Charing Cross Hospital. The child had done well owing to the care which the mother had taken, and in the other cases of the kind he had the patients also fortunately had good mothers. The specimen he showed was obtained from a patient with very severe pulmonary tuberculosis. A mastoid operation was done six months before death, and there had been chronic otorrhœa and facial paralysis. About ten weeks after the mastoid operation the wound was more or less dry, and the patient went to the north of France, where sanatorium treatment was carried out, but death ensued from pulmonary and intestinal tuberculosis. At the *post-mortem* examination it was found that the wound had not completely healed, there was

some discharge, and granulations were growing from the dura mater which formed the roof of the mastoid cavity.

Mr. STUART-LOW said he had brought forward cases to illustrate what he considered to be successful surgery in tuberculosis of the ear, also because the cases illustrated some methods which he had found useful. There could be no doubt the cases were tuberculous. Agreeing that the route of infection in these cases was by way of the Eustachian tube, if the case was not too acute, and there was no mastoiditis, he thought the throat should be operated upon first. In this way the enlarged and septic tonsils and the often more septic adenoids were got rid of and re-infection of the aural cavity prevented. He was certain that many cases in which the ear again began discharging and ultimately became as bad as before operation, were due to the tonsils and adenoids being left. If there were an acute mastoiditis, of course, this had first to be operated upon, but in such instances the enlarged tonsils and adenoids should be removed as soon as possible after the mastoid had been operated upon. The septic, and very often fetid, discharge in the meatus and tympanic cavity should be thoroughly got rid of before operation, and for this purpose he had long since given up syringing the meatus. There were dangers in syringing, as it was likely to drive the sepsis farther afield into the antrum. He now exclusively employed suction to remove these discharges—the suction was most effective, and he used it before operation so as to get a clearer field to work upon; suction was also most helpful during the operation to keep the wound free of blood and to get rid of the pus lurking in the interstices of the bone. The wound and whole bony cavity were then rubbed over with a solution of chloride of zinc, and left open, only a very light gauze dressing being applied and changed daily. No syringing was used during the after-treatment, only suction. In this way the discharge was thoroughly drawn off; no tension ever occurred, and the parts healed up very rapidly.

Dr. FRASER said that he had himself operated upon fifteen cases, with only one, or at most two, cures. He did a very radical mastoid operation, exposing the dura mater of the middle and posterior cranial fossæ as widely as possible, for the dura was the only tissue which formed a good barrier to the spread of tubercle. He treated the cases afterwards by administering sodium iodide to the child in its bottle, and packing the cavity with gauze soaked with peroxide of hydrogen, on the same lines as in tubercle of the nasal mucous membrane (Pfannenstiel).

Sir STCLAIR THOMSON said he did not feel that he could contribute anything to the debate, but for some time he had felt that he might have been neglecting the opportunities for studying the condition afforded by the King Edward VII Sanatorium. And yet he might not have been neglecting those opportunities, seeing that the disease was so very rare in the ear! When he began his work there he did not make a search for it, and more patients might have had the disease in the ear than he thought, because they did not complain of it. In three years he had seen there 800 patients, who had been admitted for tuberculosis of the lung. By excluding those who did not show the tubercle bacillus, the number might be stated as 700: 178, or 25 per cent., had tuberculosis of the larynx; but among the 700 patients he came across only two with what he took to be tuberculosis of the ear; the cases were painless, and the discharge only slight. The description of "watery and curdy" discharge mentioned, by Dr. Wingrave was new to him (the speaker), but it was a correct description of the discharge in those two cases, and of other cases which he had seen in private. Because of the painlessness and scanty discharge,

there might have been other cases which he did not know of; though he did not think there could have been many, because all complaints were there carefully looked into. He hoped he might gather from the debate how, without the aid of animal experiment, one could recognise tuberculosis of the ear. The few cases he had encountered seemed to have been absolutely uninfluenced by sanatorium treatment, though he had seen only advanced cases, in which the prognosis was black from the beginning, and so treatment applied to the ear seemed useless.

Professor URBAN PRITCHARD said he knew but little of the new pathology and bacteriology, but he felt that, excellent as it was, it had one danger—namely, that it was apt to affect the diagnosis from the clinical standpoint. He had seen cases which, to an old stager, were undoubtedly tubercular, cases in which there was tubercle in other bones of the body, and which younger men doubted, from laying too much stress on the finding of the bacillus. He would, therefore, insist on the continuance of the study of these cases from the clinical point of view. Another point concerned the after-treatment in cases in which operation on infants was performed for tubercular disease of the mastoid. He agreed as to the immense importance of good general treatment, and he could illustrate that by a case. A very thin and wasted baby was brought to him, evidently the victim of tubercular disease of the mastoid; the wasting was so severe that it was of no use to attempt operation. But he prevailed upon the father to allow the child to be taken into the hospital under the care of Dr. Still, for if it could be got into better general health an operation might be possible. That was agreed to, and six weeks afterwards the child was so much better that he (the speaker) operated. A year later the child was again brought, simply a bonnie little boy. It had been well treated in the open air in the country, and had made a good recovery.

Dr. DUNDAS GRANT said he had been asking himself why, with the material at Brompton Hospital, he had not had more extensive experience of tuberculosis of the middle ear. In the adult it was a comparatively rare complication of pulmonary tuberculosis. He thought the mode of infection in tuberculosis of the mastoid in children was chiefly through the blood; but with the shorter Eustachian tube in the child, and its increased patency, there was no reason why infection should not be by way of that tube, though the bone localisation seemed to suggest the blood as the medium. In the adult he thought it was chiefly through the Eustachian tube, and perhaps during coughing there was projection of material through that tube. This should not take place in the healthy person, because it was in a contrary direction to the action of the cilia, and the tube was very narrow. In wasting diseases, however, the tube became abnormally patent owing to the absorption of the fatty layer in the wall and the action of the cilia might be disturbed. This question of route was not of mere academic interest, but was of great importance, both with regard to prophylaxis and treatment. He thought that in the case of the child the main factor in prophylaxis was looking to the milk supply (bovine tuberculosis), and the maintenance of the child's powers of resistance by every possible means. In the adult, the hygiene of the naso-pharynx he regarded as very important, especially if the Eustachian tube was accepted as the channel of infection.

With regard to the diagnosis, the occurrence of the discharge without pain, as mentioned by Dr. Logan Turner, was very important. The fallacy was that the discharge might occur without pain in cases in which, at a time previous to that which a patient could remember, there had been

perforation of the tympanic membrane. Dr. Grant had found that often the disease was ushered in by deafness, and hardly any other sign. The tympanic membrane might then, perhaps, present a grey fluffy appearance, and on puncturing, typical caseous material would be exuded. Sometimes multiple perforations were seen, and in one otherwise non-characteristic case he got on to the scent of the tuberculous factor by the fact of there being two perforations.

With regard to the presence of bacilli, this need not indicate that there was disease of the petrous bone; and the absence of bacilli did not always exclude it. A small portion of tissue might be removed by means of Hartmann's miniature punch forceps for microscopical examination; he had shown such a specimen which the pathologist said was definite enough, and the after-history proved it. Bearing in mind the considerable proportion of cases in which suppurative otitis in tuberculous subjects got well, he thought there must be a number in which middle-ear supuration must have been a coincidence, rather than part of a tuberculous process, and naturally the weak state of the patient favoured the persistence of the discharge. Everything seemed to depend upon adopting hygienic treatment, and adopting a policy which was a complex of conservatism and enterprise. He thought pyoktanin had a beneficial effect in tuberculosis of the middle ear, and sometimes it was well to combine tuberculin with other treatment, but he would not use tuberculin for diagnosis in these cases. There was nothing worse than setting up a focal reaction in a bone which was so close to the meninges. As Prof. Pritchard said, one avoided operating when the strength of the patient was at the lowest ebb; but a practical rule was laid down by Politzer with regard to the occurrence of tuberculosis of the middle ear in relation to pulmonary tubercle. If the ear trouble developed secondarily to the pulmonary, one should, as a rule, abstain from operation; but if the onset of the middle-ear disease was the first event, operation was advisable.

On the whole, he thought the kind of cases under discussion were to be looked upon with some hope; one should not regard every case of suppuration in the middle ear associated with pulmonary tuberculosis as necessarily beyond treatment. Many, he felt sure, were not tuberculous, and were susceptible to benefit from treatment, as also many of those which were actually tuberculous.

Dr. JOHNSON HORNE reminded members that the subject was fully discussed by the Otological Society of the United Kingdom twelve years ago (February 2, 1903). The report¹ of that debate, to-day, might be read with advantage, and when read side by side with the report of the present debate it would be found that not much had been added to the sum total of their knowledge of the disease. That was not a disparaging remark, on the contrary, it was a fact which helped to prove that in primary tuberculosis of the ear—and that was the phase of the disease with which the debate had been mainly concerned—they were dealing with a disease which presented definite clinical symptoms and appearances, which occurred at a particular period of life, and which caused pathognomonic changes in the temporal bone. He had so recently² discussed in the Section the clinical and pathological aspects of the disease that he intended to direct his remarks more towards the aetiology of primary tuberculosis of the temporal bone.

When opening the discussion twelve months ago he pointed out that the stress of the disease was more upon the mastoid bone itself, and

¹ *Trans. Otol. Soc. of the U.K.*, 1902-03, iv, pp. 30-57.

² *Proc. Roy. Soc. Med.*, 1914, vii (Otol. Sect.), pp. 49 *et seq.*; *ibid.*, p. 62.

suggested that the disease should be grouped under tuberculous diseases of bone. In the same discussion Mr. Hugh Jones referred to a paper by Dr. Nathan Raw in the then current number of the *British Medical Journal*, pointing out that bones and joints were more susceptible to bovine tuberculosis. Since then, further evidence had been brought forward in support of that view, and that evening it had been stated that bacteriologists regarded primary tuberculosis of the ear as more probably due to bovine than to human tuberculosis. In addition to the findings of the bacteriologist there was clinical and circumstantial evidence of a most valuable nature in support of the bovine origin of the disease. In the first place, the age of incidence of primary tuberculous disease of the ear. If an average were struck off the ages at which those cases came under notice it would, in his opinion, be found to be between one year and fifteen months, that was to say, the age of incidence of the disease would be during the period of the milk diet of life. Upon further inquiry, it would be found that the majority of the cases occurred in bottle-fed and not in breast-fed children. That latter fact had been brought out by the valuable statistics supplied by Dr. Logan Turner and Dr. Fraser from Edinburgh.

A piece of circumstantial evidence in support of the bovine nature of the disease was, that cases of primary tuberculosis of the ear so seldom came under notice in private practice, that was to say, from amongst a class that carefully considered the milk supply. The solitary exceptions that occurred, when investigated, supported the bovine theory. Another piece of circumstantial evidence that supported the bovine theory was the enormous discrepancy in the frequency with which primary tuberculosis of the ear was met with in hospital clinics in different districts. Upon inquiry, those discrepancies were fully explained by the amount of slum and impoverished districts which the hospitals immediately served. Lastly, the enormous involvement of the peritotic lymphatic glands supported a bovine origin of the disease.

Mr. RICHARD LAKE said that in his last case of tuberculosis in a child, he had added tuberculin to its diet, and the result had been very good, though he could not say what part the tuberculin played. Sir St. Clair Thomson and Dr. Horne had both spoken on a point it had been his intention to raise—namely, the great rarity with which one saw tubercular disease of the ear among patients in a sanatorium. When he ceased his connection with the Mount Vernon Hospital he had seen 600 cases of laryngeal tuberculosis, but not one of tuberculous disease of the ear, although one or two patients had a discharge from the ear; though there might have been a bacillus or two in the discharge, he did not consider them tubercular. He believed the reason was that people had to wait a long time before they could get admitted to a sanatorium, and if their case was acute they died before admission. His private practice showed him the same thing—ear trouble was found more in acute cases. One might say that in adult aural tuberculosis the chance of recovery varied inversely with the acuteness of the chest trouble. A very interesting case was that of a man who had been shot through the lung in the South African War. He contracted tuberculosis of lung, larynx, and ear; there was a tuberculoma on the false cord. He was taken into hospital, and his mastoid operated upon. Dr. Peters removed the tuberculoma, and now, four years later, he was still well. When there was active lung trouble, it was not wise to operate on the ears.

Mr. MARK HOVELL said that, in his experience, tuberculous disease

of the ear was comparatively rare. The last case of the kind he saw was that of a child, aged nine months, which had been fed, almost entirely, on milk from a neighbouring farm. There was no other source of infection, and everything pointed to the milk as the source of mischief.

MR. E. D. DAVIS, referring to Dr. Fraser's practice of using sodium iodide and hydrogen peroxide, said Major Waggett and he had been in the habit of painting the mastoid operation cavities with iodine, and packing with gauze soaked with hydrogen peroxide. Major Waggett and he thought the results were much better. At Mount Vernon Hospital he saw about 500 advanced cases of laryngeal tuberculosis, but not one of tuberculosis of the ear, though there were some cases of otorrhœa.

THE PRESIDENT expressed the indebtedness of the Section to the gentlemen who had participated in the discussion. Several speakers had, unconsciously, supported one another in certain matters—for instance, the likelihood that the disease was bovine tuberculosis in infants and human in adults, and the infrequency of tuberculosis of the ear among sanatorium patients. Contaminated milk certainly seemed to play a large *role* in the production of this disease in children. He agreed with Dr. Grant as to the rarity of the disease in adults. For a year he went to a large Glasgow Poor Law hospital, where all the phthisis cases were segregated, for the purpose of seeing cases of non-suppurative ear disease, otosclerosis, and nerve affections of the ear, and he was struck with the relative rarity of suppurative disease in phthisical patients. The remarks as to the frequency with which bottle-fed infants were attacked bore out the idea as to milk being the common mode of infection. There was much to be said in favour of Dr. Pritchard's remark as to the importance of *clinical* diagnosis, since many of the latest laboratory tests were intricate and required some time for performance. The discussion had been to him most instructive and interesting.

MR. STUART-LOW said that he believed cases could be cured by operation, as shown by the two cases he had exhibited that day, but there was the danger attendant upon the children returning to their unhealthy homes, and for this supervision was necessary. With regard to cow's milk, calves were not tuberculous when born, nor even as late as two years of age. This being so, a fresh breed of milk cows could be reared and so tuberculous milk would cease to be produced.

DR. FRASER said that their cases were practically all in children under two years of age (nine adults to fifty-one children was their proportion), and to ascertain whether very young children were deaf was not an easy matter. Between the infantile bovine cases on the one hand, and those associated with advanced phthisis pulmonalis on the other hand, there were scarcely any cases of tubercle of the ear. His belief was that the treatment of early cases was preventive, as operation offered little chance of permanent cure. If one had to send children back after operation to their unhealthy homes, such as those in the slums of Edinburgh, one felt the hopelessness of operation. But if they could be sent to a sanatorium afterwards, it was worth while to operate. Ruttin, of Vienna, had told the speaker that if there was pain in these tuberculous cases they operated; if no pain, no operation was done, because a cure was not to be expected. One could not get all the granulations away, nor the last vestige of disease. In regard to the prevention of tuberculous ear disease in infants, 20 per cent. of the Edinburgh milk was tuberculous, and it was said it would cost the nation £40,000,000 to ensure a milk supply free from possible

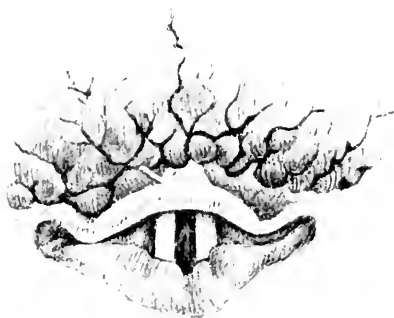
contamination by tubercle. Statistics compiled by John Fraser and Mitchell with regard to tuberculosis of bone and glands in children showed that 70 per cent. of tuberculous bone disease and 90 per cent. of tuberculous cervical gland disease in children was of bovine origin. If all tuberculous cows were slaughtered, following a tuberculin test, there would be little or no need for operation on tuberculous otitis media, as the cause would have been eliminated.

Abstracts.

PHARYNX.

Grant, J. Dundas.—A Hiding-place for Fish-bones in the Throat.—
"Clinical Journal," December 16, 1914.

A case is narrated to illustrate how, in searching for fish-bones in the



throat, examination ought to be made with the laryngeal mirror held first in one hand and then in the other.

A woman came complaining of a discomfort in the throat produced, she said, by a fish-bone. On careful examination the writer was unable to discover anything abnormal. He thereupon asked a clinical assistant to make a search, and this observer was able to perceive what he took to be a fine fish-bone buried between the epiglottis and the base of the tongue. The writer then noticed that while he himself held the mirror in his left hand, the assistant held the mirror in his right, and when the former made a fresh examination with the mirror in the right hand, the fish-bone became visible to him.

Dan McKenzie.

NOSE.

McBean, G. M.—Variations of Sphenoidal Sinus Disease. "Annals of Otology," vol. xxiii, p. 419.

Describes nine cases. The author believes that sphenoidal disease is much more common than was formerly supposed. His nine cases occurred in six years. In these headache was the most constant symptom, most often occipital and post-ocular on the affected side. Eye symptoms

were variable or lacking. Loss of vision in only one case (of hypophysis tumour) from involvement of optic nerve. Discharge was mostly mucopurulent, in two cases forming crusts. Three died: two acute cases recovered: three were benefited by operation: one had no treatment.

Macleod Yearsley.

Murphy. John.—Accessory Nasal Sinus Suppuration. "Australian Medical Journal," June 20, 1914.

In suppuration of the maxillary sinus the author recommends that the sinus should be explored under the inferior turbinal. It should now be washed out with normal saline solution till the fluid comes away clear: it should then be dried by forcing air through. If after drying this pus still appears under the middle turbinal, we may conclude that the frontal sinus in the anterior or middle ethmoidal cells contain pus. If after removing the anterior end of the middle turbinal and washing out the frontal sinus, pus is still present in the middle turbinal region, it will be coming from the anterior or middle sphenoidal cells. Pus above the middle turbinal is from the posterior ethmoidal cells or sphenoidal sinus. The notes of nine cases submitted to operation are given.

A. J. Brady.

LARYNX.

Price Brown (Toronto).—Spindle-cell Sarcoma of the Larynx. "Canadian Practitioner," December, 1911.

On February 17, 1911, a young man, aged twenty-three, tall, anæmic and thin, was referred to the writer for treatment. He had been suffering from soreness of left side of throat with gradually increasing stenosis for two months. Swallowing was difficult and painful. Fluids went down easier than solids. Night cough. Respiration difficult but easier through nose than mouth. Worked as lithographer up to previous day.

Examination.—Nose and naso-pharynx normal. A large, dark-red, corrugated tumour filled the larynx on the left side. It was widely sessile. It seemed to be attached to the whole length of the left ventricular band, the commissure, the left arytaenoid, and the left hyoid region. The epiglottis was unaffected externally; but internally the whole of the left side seemed to be involved. As the voice was clear, though muffled, the vocal cords were believed to be unaffected. The tumour resembled a huge dark strawberry hiding the whole of the entrance to the larynx on the left side, overlapping it into the pharynx, and leaving merely a narrow slit on the right. Externally the adjacent glands in the neck were slightly enlarged and tender.

The diagnosis at the time was malignant disease. Several days later pathological examination of a large segment proved it to be spindle-cell sarcoma.

Believing from the size and position of the growth that operative treatment *per vias naturales* would be more effectual than external operation, electro-cautery operations were at once commenced, and continued at varying intervals of twelve hours up to one week until June, when the case was reported at the annual meeting of the American Laryngological Association. By that time the patient's weight had increased from 124 lb. to 140 lb. The great bulk of the rapidly growing

tumour had been removed: but as it continued to develop in the region of the left ventricular band and thyro-hyoid region, electro-cauterizations were still required. His appetite was good, swallowing perfect, and pain almost gone.

By the middle of June the patient was able to resume his occupation, and has continued his daily work for the last five months. The growth of the sarcoma, however, still requires the control of the cautery at varying intervals.

During all the earlier months of treatment anaesthesia was induced by local application of cocaine and adrenalin, the strength of the former being 10 or 15 per cent. solution. Latterly the relief from pain was unsatisfactory: and a long curved submucous syringe was made on the design of the writer, so that injections could be given directly into the mucosa of the larynx—the pain of operation was by this means very much diminished. At the present time, ten months after first seeing the patient, the prognosis is doubtful, although the control is still in hand.

Note.—The hemorrhages during the earlier treatments were exceedingly severe. As the tumour diminished in size the bleeding became less. Latterly with each operation it is very slight. The sloughs following cauterization were, during the earlier stages, removed by laryngeal forceps or snare. Latterly the little sloughs that form are expectorated between the treatments. The cautery knife has always been used at an intense heat—dull red being ineffectual as a destructive agent. The voice of the patient has always sustained its strong, hoarse, vibrating power. And last: the power of deglutition has never been impaired by the prolonged series of electro-cautery operations, neither fluids nor solids having found an entrance into the larynx.

Author's abstract.

Thomson, Sir StClair (London, England).—**Intrinsic Cancer of the Larynx.** "The Journal of the American Medical Association," September 19, 1914.

In reporting a case of complete excision of an epithelioma of the vocal cord apparently affected by endo-laryngeal operation, Sir StClair Thomson emphasises the remarkably satisfactory treatment of intrinsic cancer of the larynx by laryngo-fissure, and draws the following conclusions:

(1) Cancer of the vocal cords is, in early stages, a very slowly progressive and strictly limited process. Alteration of voice is the principal and may be the only symptom.

(2) Diagnosis is based chiefly on inspection of the larynx. Only in certain cases in which the growth is a superficial and not an infiltrating one can it be confirmed by microscopic examination.

(3) The growth can sometimes be completely removed by endo-laryngeal operation in early cases.

(4) Laryngo-fissure is the operation of choice in all cases of endo-laryngeal cancer.

(5) The operation offers the very best prospects, because the disease remains for some time superficial and limited, and secondly, because laryngo-fissure cannot be considered a dangerous operation.

(6) No patient has been lost by operation, and statistical results show a lasting cure in 80 per cent. of cases.

Birkett (Rogers).

EAR.

Braislin, W. C.—Further Remarks on the Use of Nitrate of Silver applied within the Mouth of the Eustachian Tube for the Relief of Tinnitus. "Annals of Otology," vol. xxiii, p. 402.

The author uses a double, twisted strand of silver wire and gives minute directions for the preparation of the cotton tip. The silver nitrate is used in a solution of 4 per cent. *MacLeod Yearsley.*

Kopetzky, S.—Latent Mastoiditis complicated by Toxic and Irritative Cerebral Symptoms, accompanied by Blindness and a Streptococæmia caused by Trauma: Operation: Recovery. "Annals of Otology," vol. xxiii, p. 391.

Woman, aged twenty-seven. Acute left otitis a year previously. Illness originated in a slight blow over the left supra-orbital region three weeks before admission. The history is indicated by the title of the paper, and the interesting points about the case are: The insignificant incident which started the train of symptoms; the symptom of brain abscess; the interference with the association fibres, causing suspicions of an abscess in the frontal lobe; then, later, in the silent area of the temporo-sphenoidal lobe; positive blood culture—*Streptococcus mucosus*; blindness, with left ptosis; late involvement of the middle ear (four days after exploring the frontal lobe); and the remarkable recovery from all the symptoms.

MacLeod Yearsley.

Lutz, S. H.—How the Patient can help himself in Cases of Chronic Catarrhal Otitis Media. "Annals of Otology," xxiii, 377.

Pleads for a wider survey of the patient's body than the otologist is sometimes inclined to give, especially as regards circulation and digestion. "The otologist who does all his work with a Politzer bag, catheter or other instruments, frequently finds his patients missing when he needs them most." Attention is drawn to the ill-drained nose in the causation of chronic middle-ear catarrh and the writer warns against violent nose-blowing.

MacLeod Yearsley.

Stewart, M. J.—On the Cellular Reactions induced by Local Deposits of Cholesterin. "Journ. of Path. and Bact.," January, 1915.

An important contribution to the pathogenesis of cholesteatomatous changes in various situations, including the middle ear.

It is shown that cholesterin is a normal constituent of all cell tissues associated with lecithin, and that local deposits are due to tissue necrosis under conditions unfavourable to its escape. That the deposit of cholesterin in living cells is due to giant cell influence, and that giant cells are formed by fusion of endothelial cells. Further, that cholesterin itself is a potent stimulant.

[These are important points, since they throw much light upon the existence of cholesteatomata in deeply-situated regions, where epidermal elements do not occur, as, for instance, in the antro-pneumatic spaces and the cranial cavity. Abstractor has already shown in the "Pathogeny of Cholesteatomata,"¹ their probable origin from tympanic epithelium, but the difficulty was to explain their presence in the adjacent pneumatic spaces, which are lined with endothelium—a mesoblastic element. This paper

¹ "Pathogeny of Cholesteatomata," *Proc. Roy. Soc. Med., Otol. Section*, July, 1910.

shows that endothelial elements may be the sources of cholesterin, and that giant cells were specially responsible. The abstractor agrees that this is probable in view of the striking metaplastic evidence in granulo-matous material from the middle ear, and in the tonsils, and it adds further support to the view that endothelium as well as epithelium may be a source of cholesteatoma. It is difficult, however, to accept the view that giant cells are essential, since most of the cholesteatomata of ear and tonsil are not the seat of granulomata, and further, that giant cells are often present when cholesteatomata are not.]

Wyott Wingrove.

MISCELLANEOUS.

Stoll, H. F., and Heublein, A. C.—**Tuberculosis of the Bronchial Glands and Lung Hilus: A Clinical and Radiographic Study.** "Amer. Journ. Med. Sci.," September, 1914.

Prior to the fifteenth year, tuberculosis of the bronchial glands and lung hilus is the most common form of tuberculous disease. Early symptoms are usually indefinite and chiefly of toxic origin. Significant signs are a so-called "hilus dimple," dilated veins, parasternal and pre-vertebral dulness, and, most important of all, a well-marked whispered bronchophony in the interscapular region (d'Espine's sign).

Radiography, and especially stereo-radiography, is of the utmost value in these cases, as it shows the exact location and extent of the morbid process.

Infants with tuberculosis of the bronchial glands are prone to attacks of dyspnea, in which the stridor is chiefly or wholly expiratory in character, thus differing from thymic asthma, in which the dyspnea is inspiratory. As the disease progresses, the dyspnea affects both inspiration and expiration. In a number of instances the condition has been mistaken for one of laryngeal diphtheria, and intubation has been performed, in spite of the persistence of the voice which should render this mistake impossible.

Thomas Guthrie.

Stein, Prof. von (Moscow).—**Observations on the Treatment of Cancer and Sarcoma by means of Pyraloxin, etc.** "Zeitschrift für Laryngologie," Band vi, Heft 6.

Prof. von Stein comes to the following conclusions: Pyraloxin is not poisonous, even if used for a long time. It can apparently cure cancer in the early stages. It localises the growth especially if used in combination with calcium salts. A case of lympho-sarcoma was beneficially treated with pyraloxin. Pyraloxin and nakasilik should be given before operation in all cases of cancer and sarcoma. Even in hopeless cases the fatal result is more or less delayed by treatment with pyraloxin and nakasilik.

J. S. Fraser.

REVIEW.

The Tonsils. By HARRY A. BARNES, M.D., Instructor in Laryngology, Harvard Medical School, etc. London: Henry Kimpton. Price 12s. 6d. net.

It is the purpose of this book to focus our present knowledge of the tonsil, and it does it, on the whole, in an admirable manner and at

a reasonable length. After the large flow of literature which has swollen the periodical medical press of recent times, it is somewhat surprising how little real advance has been made. It is upon the relations of the tonsils to systemic infections that most light has been shed, and the account of it forms one of the best chapters in the book. The author's conclusion is: "After other sources of infection have been eliminated as far as possible, the removal of the tonsils may be advised as a therapeutic measure, even when clinical examination fails to show any pathological condition in them." He advocates tonsillectomy, and carries it out in the present vogue—a return to the advice of Celsus that "they should be seized by a hook and excised with a scalpel." *D. R. Paterson.*

OBITUARY.

WE regret to notice that death has been busy amongst many of our well-known and esteemed American colleagues. The recently issued *Transactions of the American Laryngological Association* contains obituary notices of no fewer than six of their Fellows. As our readers know, this Association is the blue ribbon of American laryngology. The number of Active Fellows is strictly limited to 100, and there are seldom 90 on the list, as election to it is well guarded. To read of the death of six colleagues in such a select company therefore gives us pause.

The first name is that of Dr. Arthur Ames Bliss, who, although he had studied in London in the eighties, was not very much known on this side. He was at one time associated with Dr. J. Solis Cohen and practised in Philadelphia.

Dr. Charles E. Bean was also much influenced by Dr. J. Solis Cohen, the *doyen* of American laryngology. He practised in Philadelphia and afterwards at St. Paul, Minnesota.

Dr. J. W. Gleitsmann had many friends in London, as, indeed, he had all over the world. He was an excellent specimen of the cultured German-American physician, a well-read man, a lover of art, a mountain climber, and a genial companion. He contributed freely to medical literature, as a reference to our own volumes and indices will show. He was a frequent visitor at congresses, and we have had the pleasure of seeing him in London, as well as in Berlin, Moscow, and Buda-Pesth. It is one of life's little ironies to note that in 1866 he fought for the Germans in their war against their present ally, Austria, and was decorated with the Iron Cross. He had been settled in New York since the early eighties. As he was born in 1841, he had lived a good life—full of activity, heartiness, and geniality.

Dr. Charles Huntton Knight was also a man of culture and refinement. He was a great lover of music and an expert performer on the violoncello. He was attached to the New York Polyclinic, and his textbook on "Diseases of the Nose, Throat, and Ear" is well known on this side, and has been favourably reviewed in our own pages at the beginning of this century.

Dr. William Kelly Simpson was well known as a laryngologist, but better still as a man with the gift of friendship. He had a perfect genius for spreading cheerfulness about him with his hearty, joyous disposition, and the writer of these notes will always preserve a happy recollection of three days spent with Kelly Simpson in the quadrangles and Common Rooms at Oxford. He succeeded Prof. George M. Lefferts

at the Vanderbilt Clinic and was associated with O'Dwyer in his early intubation work. He died at the comparatively early age of sixty, being suddenly stricken, as he would have wished, while in the full possession of his sparkling faculties.

Dr. Ernest Lorenzo Shurly had also many friends on this side of the Atlantic, where his modesty and charm of manner always made him a welcome visitor to our gatherings or clinics. He was long identified with laryngology in Detroit, and his treatise on "Diseases of the Nose and Throat" was, in its time (1900), a valuable text-book. He was an enthusiastic supporter of a high standard of medical etiquette in the profession. We are sorry we shall not welcome his gentle presence amongst us again.

We sympathise with American laryngology in these severe losses, and cannot let them pass without an exclamation of "Hail and farewell!"

StClair Thomson.

NOTES AND QUERIES.

"The spatial sensibility of the tympanic membrane has hitherto been very little studied, though the subject will well repay much trouble. If we approach it by introducing into the outer ear some small object, like the tip of a rolled-up tissue-paper lamplighter, we are surprised at the large radiating sensation which its presence gives us, and at the sense of clearness and openness which comes when it is removed. It is immaterial to inquire whether the far-reaching sensation here be due to actual irradiation upon distant nerves or not. We are considering now, not the objective causes of the spatial feeling, but its subjective varieties, and the experiment shows that the same object gives more of it to the inner than to the outer cleft of the ear. The pressure of the air in the tympanic cavity upon the membrane gives an astonishingly large sensation. We can increase the pressure by holding our nostrils and closing our mouth and forcing air through our Eustachian tubes by an expiratory effort; and we can diminish it by either inspiring or swallowing under the same conditions of closed mouth and nose. In either case we get a large, round, tridimensional sensation inside of the head, which seems as if it must come from the affection of an organ much larger than the tympanic membrane whose surface hardly exceeds that of one's little finger-nail.

"The tympanic membrane is, furthermore, able to render sensible differences in the pressure of the external atmosphere, too slight to be felt either as noise or in this more violent way. If the reader will sit with closed eyes and let a friend approximate some solid object, like a large book, noiselessly to his face, he will immediately become aware of the object's presence and position—likewise of its departure. A friend of the writer, making the experiment for the first time, discriminated unhesitatingly between the three degrees of solidity of a board, a lattice frame, and a sieve, held close to his ear." . . . "When an object is brought near the ear we immediately feel shut in, contracted; when the object is removed we suddenly feel as if a transparency, clearness, openness, had been made outside of us."¹

With all due respect to a great authority one is inclined to query whether this peculiar sensation is not due rather to the sense of hearing than to the tactile sensibility of the tympanic membrane. The feeling of *emptiness* in dark space around us—in the silent and deserted streets, on an expansive moor, or on a hill-top at night—is due, partly at all events, to the ease with which feeble sounds are then heard as compared with the same sounds during the busy day, and also to their ringing and echoing quality as compared with their muffled character when they are produced in a more enclosed and shut-in space. Deaf people are probably incapable of appreciating the feeling of empty space. D. M.

¹ "The Principles of Psychology." William James. 1901, vol. ii, p. 139, *et seq.*

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**CEREBRO-SPINAL MENINGITIS AND THE SPHENOIDAL
SINUS.**

For some time past it has been generally recognised that the usual habitat of the meningococcus intra-cellularis of Weichselbaum—the causative organism of cerebro-spinal fever—is the naso-pharynx, and that its extension to the meninges is only an occasional happening. It is to this circumstance that the seemingly haphazard and irregular incidence of epidemics of cerebro-spinal fever may be traced. The patients who develop the meningitis obviously constitute but a small number of those who are attacked by the organism, so that the epidemic infection is much more widely distributed than the number of cases of meningitis would lead us to suppose.

Before these discoveries were made, efforts at isolating sufferers from the meningitis must have had little or no effect in checking the spread of the disease. But recent investigation, a summary of which we publish at p. 295 of the present issue of the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, has enabled us not only to lay our hands upon those carriers of the disease, but also, by suggesting suitable local treatment, to cure their naso-pharyngeal infection and so to render them innocuous. In which respect we are more fortunate than we are when dealing with the carriers of typhoid and diphtheria germs, the permanent expulsion of which from the carriers is always difficult and sometimes impossible.

While that amount of progress could be recorded, however, much doubt was felt as to the route by which the organism could reach the meninges from the naso-pharyngeal spaces in those subjects who developed meningitis; on the one hand, the blood-stream, and on the other, the local lymphatic vessels being looked upon as the more likely by the different writers on the subject.

Here the matter rested and progress was stayed until opportunity was afforded of an investigation of the pathological phenomena by Major D. Embleton and Capt. E. A. Peters, the latter of whom is an experienced oto-laryngologist. From the material at their disposal these workers have been able to demonstrate¹ to their satisfaction that in epidemic cerebro-spinal meningitis there is a meningococcal infection of the sphenoidal sinus, and that the organism when it reaches the intra-cranial structures does so by traversing the bone between the sinus and the meninges, setting up an osteitis in its progress. Thus the hitherto concealed link in the chain of events has now become exposed to view.

Dr. Peters, who has furnished us with an interesting note on the intra-nasal appearances in meningococcus infection (see p. 267), suggests that the sphenoidal sinus disease tends to lead on to meningitis if the sinus ostium becomes blocked—that is to say, that the best method of preventing the more serious development in simple meningococcus nasal and naso-pharyngeal infection is to provide free drainage of the sphenoidal sinus in the manner familiar to the modern rhinologist.

The special liability of children to the meningeal complication is explained by the readiness with which the thick mucosa of a child's nose swells up and blocks the orifice of the sinus.

Dr. Peters has taken the further step of opening up and washing out the sphenoidal sinus after the meningitis has developed, and, although the case in which this treatment was first tried did not recover, nevertheless this is obviously the proper treatment to adopt, just as otogenic meningitis demands not only the drainage of the meninges, but also the ablation of the focus of infection in the temporal bone.

If these findings prove to be well established—and we have every confidence that they will be—then the discovery will undoubtedly turn out to be one of the utmost importance and utility in the prevention and treatment of an epidemic disease, the extensive prevalence of which has recently given rise to justifiable disquietude, and even apprehension.

¹ See p. 296 of this issue.

There is another aspect of the discovery which we cannot refrain from mentioning, and that is that it proves beyond all doubt the importance of furnishing our new armies with expert oto-laryngologists. It has been whispered that the War Office authorities, *more Britannico*, have so far appointed very few oto-laryngologists as such. This may or may not be the case. But if there should be any foundation for the rumour, then those who are urging the claims of our speciality to a full and adequate recognition can cite no fact more strongly in favour of their contentions than this advance in our knowledge of cerebro-spinal meningitis, an advance which we owe, partly at all events, to the oto-laryngologist at the Royal Victoria Hospital, Netley.

NOTE ON THE NASAL CONDITIONS OF CEREBRO-SPINAL MENINGITIS.

By E. A. PETERS, TY. CAPT., R.A.M.C., M.D., F.R.C.S.

THE local nasal conditions obtaining in cerebro-spinal fever are not very striking on rhinoscopic examination, but on probing the sphenoidal sinus two types may be recognised :

A. Those in whom the sphenoidal sinus are patent.

B. These in whom one or both sinuses are closed.

A. CASE P—— was admitted to the mental block at Netley with some delirium, a slightly raised temperature, Kernig's sign, and headache. A swab from the throat proved to be negative, as also did the first lumbar puncture. A second lumbar puncture yielded fluid, which contained some polymuclear cells. The patient was accordingly isolated and the orderlies in contact swabbed. Eight of the fourteen orderlies gave positive plates. No source of infection other than P—— was traced. The patient's temperature fell, and his progress in convalescence was soon established. On rhinoscopic examination nothing abnormal was noted except a little mucus near the ostium of the left sphenoidal sinus. A cannula fitted with a style, which was capable of being protruded when the instrument had entered the sinus, was passed through the nose and plates spread with the endosphenoidal mucus which was procured from both sinuses. Major Embleton and Lieut. Ewing pronounced the plates to be free from meningococci.

Type B. CASE W. I——.—The early history of this case was recounted in an article by Major Embleton and myself in the

Lancet of May 22nd, 1915.¹ After a week's improvement relapses occurred, and eventually the patient died twenty-four days after the opening of the sphenoidal sinus.

Kernig's sign and rigidity of the neck characterised the recrudescence of the disease. Lumbar puncture was practised on three occasions, but no fluid could be drawn off.

The mucous membrane of the bucco-pharynx was slightly moist and powdered in appearance, a condition not uncommon in other febrile diseases. There was slight cedema in the region of the sphenoidal ostia, but otherwise the mucous membrane of the nose was a little dry.

During the illness meningococci appeared from time to time in the nasopharynx. Even at the operation the ostium of neither sinus could be defined with a probe, so a small Heath's mastoid burr was used to break down the thin bone which was notably soft on the left side; a drachm of pus containing meningococci escaped from this sinus. The operation for the first forty-eight hours appeared to cause a recrudescence of the cerebro-spinal symptoms, which subsided, and general improvement set in. Eventually the patient died in a toxic condition of exhaustion, in which all the cardinal signs of cerebro-spinal meningitis had lost prominence.

The operation was undertaken on the general principle of evacuating pus, but failed to give lasting benefit in face of the extensive meningeal involvement then existing.

Permission for a *post-mortem* examination could not be obtained.

It would appear, therefore, dealing with the hypothesis enunciated by Eubleton and myself (in the *Lancet*) that type A, with open sphenoidal sinus, is characterised by a relatively mild attack of cerebro-spinal fever, and if retention of pus exists in the sinus of these mild cases, this retention can only be temporary.

In type B—one or both sinuses closed—occur the more severe cases which end fatally; in these the empyema of the sinus persists to the end, though the intercurrent appearance of meningococci in the nasopharynx suggests periodic leakage.

The following are the notes on this case which have already been published:

*An Extract from the Notes of Lieutenant J. S. ROWLANDS,
R.A.M.C., of the Welsh Hospital.*

CASE W. I—, aged 17 years, North Irish Horse, landed at Havre, August 21, 1914. December: Bad cold; slight hæmor-

¹ See p. 296 of this issue.

rhage from the lung. January 17: Rouen; tubercle diagnosed. February 14: Admitted to Welsh Hospital, Netley, with "rheumatic" pains; apparent recovery. 23: When up and about temperature rose to 104° F. (A cerebro-spinal carrier was subsequently discovered in the patient who occupied the opposite bed.) 24: Severe frontal headache; erythematous rash; pain at back of neck. 25: Definite meningeal symptoms; increased reflexes; Kernig's sign present. Lumbar puncture revealed cerebro-spinal fluid under pressure containing pus cells. No organisms discovered. (Mr. B. G. Klein's report.) 25 c.c. of serum were injected. 28: Meningococci grown from cerebro-spinal fluid. March 6: Patient has had in all eight injections of serum after lumbar puncture. Head still retracted. 7: No growth from cerebro-spinal fluid. 9: Relapse; naso-pharyngeal swab negative. 10: Autogenous vaccine (5 millions) prepared by Mr. Klein were injected by Lieutenant Rowlands hypodermically. 12: Soamin 5 gr. injected intramuscularly. 13: Cyanosis. 17: Twitching; dusky hue; incontinence of urine; no growth from cerebro-spinal fluid. 20: Improvement and lower temperature. 21: Another relapse. Lumbar puncture without serum injection. 25: Meningococci in naso-pharynx. April 2: Meningococci not found in naso-pharynx. 3: Pulse 110-120; generally better; occasional delirium. 4: Worse; lumbar puncture and serum. 7: Meningococci not found. 14: Meningococci were found in the naso-pharynx. Nasal treatment with ung. hyd. nit. dil. 5ss., menthol gr. v., ol. olivæ ad 3j—painted into the nose. 16: Urotropin given; pulse 110. 30: Transferred to Royal Victoria Hospital on concentration of cerebro-spinal cases. Up to this time seventeen injections of serum have been given, but relapses still occur. May 3: Chloroform was given by Lieutenant G. C. Adeney, R.A.M.C., and the sphenoidal sinus opened from the nose; a drachm of pus escaped from the left sinus. Neither ostium could be found with the probe, so the thin bone was broken down with Heath's small mastoid burr. Meningococci were found in the glairy pus.

Subsequent history.—The patient was rather better from the first day. There is now no retraction of the head and Kernig's sign is only slightly present, but the pulse keeps up to 115-125. May 7: Temperature again up to 101°. May 16: During the last week patient has done well; eats and sleeps well; control of evacuations. Temperature up to 100° on one occasion; Kernig present. Speech coherent. The sphenoidal sinuses are washed out daily.

**LUMBAR PUNCTURE IN AURAL AND NASAL CASES:
PATHOLOGY OF THE FLUID.**

Abstract of Lecture delivered at the Central London Throat and Ear Hospital, July 17, 1914.

BY WYATT WINGRAVE, M.D.,

Pathologist.

THE subject has already been amply dealt with in connection with primary diseases of the nervous system; to-day it is proposed to review its practical connection, especially with regard to our practice in this hospital.

It is perhaps not an exaggeration to say that 50 per cent. of cases of septic meningitis and brain abscess can be traced to the ear, nose, or their accessory sinuses. This is not surprising in view of their anatomical relations.

Through the courtesy of my colleagues an abundant supply of material from both acute and chronic cases has been placed at my disposal for examination.

What is the fluid obtained by lumbar puncture? It is the subarachnoid and not the intra-ventricular fluid. The difference is chiefly one of locality, for chemically they are practically alike. The intra-ventricular fluid is doubtless secreted by the choroid plexuses or ventricular villi which hang freely in their respective chambers. These villi or "fringes" are examples of simple ductless glands, consisting of loops of fine blood-vessels covered with a single layer of cubical cells. Their secretion simply accumulates in the ventricles and passes into the subarachnoid cistern either through the foramen of Magendie or the interpeduncular spaces of Luschka (Sir Bland-Sutton used to teach the latter).

The subarachnoid space in turn communicating with the general lymph system one would, therefore, expect to find a closer approximation to lymph in its composition. To a slight extent only is this so, for more proteids are found in the fluid from a lumbar "tap" than when collected from the ventricles at necropsies.

It is difficult to estimate the exact capacity of the subarachnoid cistern, but as much as 100 c.c. has been collected at one time. The fluid is renewed very quickly, either by secretion entirely or partly by transudation. That it is a true active secretion and not a mere passive filtration is amply proved by its chemical composition and physical characters. The flow is doubtless constant, escape being either through perineuronal spaces or by venous absorption.

It should now be examined chemically, microscopically, and bacteriologically, each affording most valuable evidence. Although sometimes quite clear the centrifuge should always be employed, since cells may be present without apparent turbidity. The clear fluid may be used for chemical tests.

The *specific gravity* is usually raised even to 1010 when morbid. "Beads" should be dropped into the test-tube, as only small quantities of fluid are available.

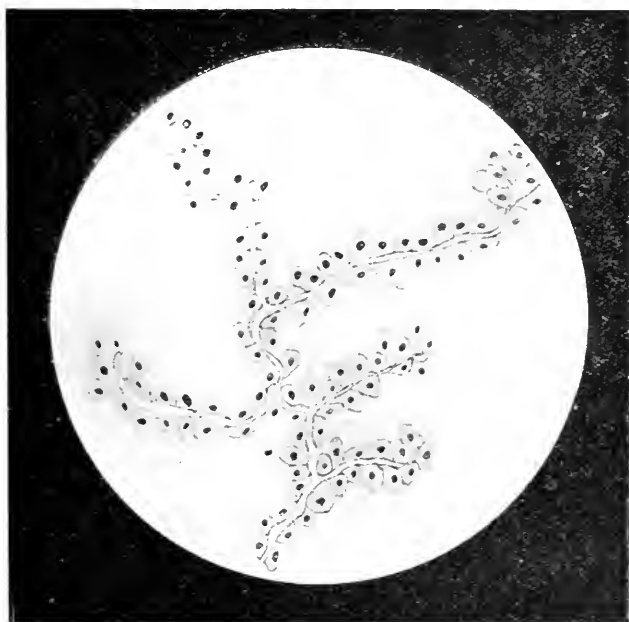


FIG. 1.—Chorioid villi. $\frac{1}{2}$ in. obj.

The *reaction* is very important, alkalinity being always reduced in cases of infection, while in some instances it may even be acid. Litmus is not reliable, a weak solution of phenolphthalein being preferable. This gives a pink reaction if alkaline, white if neutral or acid. The exact degree of acidity can only be obtained by titration.

The acidity is said to be due to lactic acid, which can be demonstrated by its decolourising Uffelmann's solution (phenol and ferric chloride). Lactic acid leaves a faint yellow tint.

The presence or absence of sugar is shown by mixing equal parts of a weak solution of methylene blue, liquor potassae and fluid.

On heating, the blue colour disappears if normal, but is unaffected if sugar be absent, or may be diminished in varying degrees. This nearly always occurs when bacteria are present, and absence of sugar is therefore a most important evidence of bacterial infection and should always be carefully looked for. This test, although extremely delicate, is not applicable to urine. It is, however, very useful for proving the presence of sugar in nasal discharge and in blood. For spinal fluid it is preferable to Fehling or Pavy's solution.

The presence of proteids is best determined by Esbach's solution or salicyl-sulphonic acid. Normally only a faint turbidity is afforded, but in morbid states there may be marked precipitation. Saturated solution of ammonium acetate requires too long a time, while nitric acid, hot or cold, is unreliable. If turbid the fluid should be filtered or centrifuged.

In cases of brain abscess albumoses may be found. These give a white precipitate with Esbach on salicyl-sulphonic acid, but it *disappears on boiling*.

Lipoids, cholesterol and other fatty derivatives are difficult to prove, but cholesterol crystals are occasionally seen in films. They may come from old brain abscesses or from cholesteatoma of the temporal bone.

Films should be made from the centrifuged deposit, fixed by heat and alcohol, and then stained and examined for cells and bacteria.

Cells.—Thionin or eosinate of blue will differentiate the various cells present. The *lymphocyte* is easily identified by its deeply-staining round nucleus with but little, non-granular cytoplasm. If present alone it is indicative of a chronic process, such as parasymphilis, some sclerotic change, or tuberculosis.

Leucocytes have relatively more cytoplasm which contains granules and their nuclei are polymorphic, rarely circular. They are characteristic of acute changes.

Endothelium from the lining of the meninges has one round or oval nucleus, with much cytoplasm free from granules. It is much larger than either lymphocyte or leucocyte.

Plasma cells are very important, being indicative of a chronic lesion and rarely seen in acute cases. They present a vivid red granular cytoplasm which selects the pyronin of Pappenheim's stain (methylene green 3, pyronin 2, H₂O 100). When old they are copper-coloured.

True chorioidal epithelium is either not found or is not recog-

nisable by reason of degenerative changes. In fact, unless the cells have only recently been shed, their identity is often difficult owing to nuclear and cytoplasmic degeneration. All these dead cells yield a powerful tryptic ferment, which has a destructive influence upon all living tissues, therefore their early removal is as important as that of bacteria.

Thus cytological evidence affords most valuable information as to the nature of the lesion.

Bacteria.—Identification of the infecting organism is first

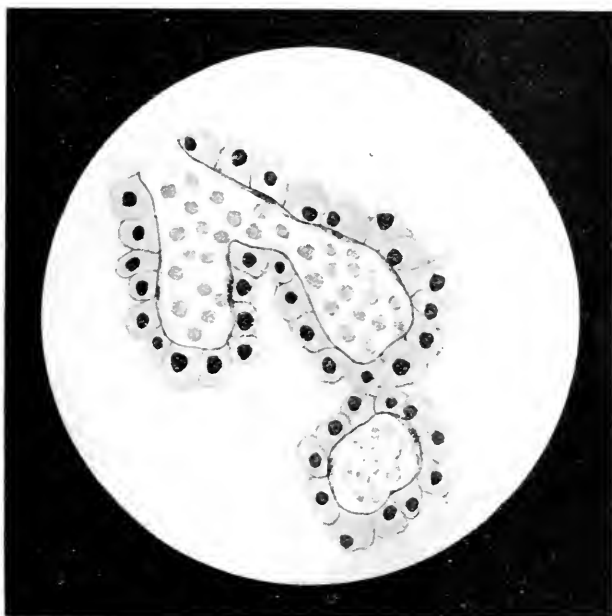


FIG. 2.—Chorioid villi. $\frac{1}{8}$ in. obj.

attempted by films, one of which should be stained by Gram's method, which differentiates between the positive and negative groups. If positive, they will most likely belong to the "pyogens," such as streptococci, staphylococci, pneumococci (Fraenkel), tetracocci, and others, such as tubercle and the diphtheroid group. If negative, suspect *Bacillus capsulatus mucosus* (Friedlander), *Bacillus coli*, *Bacillus typhos*, *Diplococ. catarrhalis*, *Bacillus pyocyaneus*, *Bacillus hastilis*, etc. In chronic middle-ear cases the infection is nearly always polymicrobial, in fact the film would easily pass as one from a "septic throat." Even spirochaetes (refringens group), with its attendant fusiform or

Bacillus hastilis, may be found in great numbers. Spirochaetes are readily identified by negative or silver colloid staining, for which one film should always be reserved, as it brilliantly defines the shape of every micro-organism. They were present in every foetid case. In acute cases, bacteria, although numerous, may be few in variety. The true meningococcus of Weichselbaum only occurs in the specific form of meningitis. Should no bacteria be found in the early films tubercle may be suspected, especially if lymphocytes predominate, with an occasional plasma cell. In this case, further centrifuging should be done with antiformin and the films again examined after appropriate staining (picro-fuchsin).

The *Bacillus capsulatus mucosus* (Friedlander) plays a very conspicuous part in nasal affections, particularly those classed as "influenzal," in which it has occurred much more frequently than Pfeiffer's bacillus. Although encapsulated and morphologically closely resembles the pneumococcus of Fraenkel, it is easily distinguished by its Gram negative reaction.

To complete the diagnosis cultures may be necessary. The simplest method is to inoculate a broth or agar tube for the ordinary pyogenic organisms, but if pneumococci are suspected a drop or two of the patient's blood should be added to the medium with a small quantity of citrate solution.

To facilitate removal of dead cells and bacteria irrigation may be employed. For this I make an artificial spinal fluid:

Sodium chloride	1.5 gm.
Potassium chloride	3.5 "
Glucose	2.0 "
Sodium carbonate	0.2 "
Distilled water	100 c.c.

This is the stock or standard solution.

For use, make a normal solution by taking 10 c.c. and diluting to 100 c.c. with boiled distilled water. This will have a specific gravity of about 1002.

With regard to antiseptics urotropin seems specially appropriate for oral administration, since its activity depends upon the liberation of formalin in the presence of an acid. As already mentioned, many specimens of morbid fluid were acid, it should at once be available, but it is extremely doubtful whether it has much influence when the alkalinity is maintained. Although its presence in the spinal fluid can be proved it is in such small quantity that effective bactericidal power may be questioned unless an acid be present.

The evidence of meningitis at the necropsies was extremely variable, not only in extent but in type. The vertex and anterior fossæ were involved in but few of the cases; in the majority it was confined to the base. In some of the deeply-seated old temporo-sphenoidal abscesses with smooth thick walls and a covering of apparently healthy cortex, there were no signs of meningitis either focal or diffused, while in others of the same type the whole sub-arachnoid space was filled with a turbid and foetid fluid containing many varieties of bacteria, but no cells except a few lymphocytes.

In addition to the diagnostic aspects of lumbar puncture in these cases, one must not overlook the therapeutic value, as it not only removes bacteria and their toxins, dead cells with their tryptic products from the spinal cord, but has in several cases afforded striking and immediate relief to the characteristic pressure symptoms of tubercular meningitis which complicated the aural trouble.

Finally, it must not be forgotten that in acute cases a second or even a third "tap" may be necessary to afford positive evidence of infection.

HERPES ZOSTER OTICUS.

By A. R. TWEEDIE, F.R.C.S.,

Nottingham.

IN connection with the case shown by Dr. H. J. Davis at the meeting of the Otological Section of the Royal Society of Medicine on February 20, 1914, and the editorial on the subject in the following June number of this JOURNAL, the following two cases may be of sufficient interest for publication and record.

Miss M——, aged forty-seven, was sent to me November 20, 1911, with the story that on September 20 of that year she visited her sister-in-law in Stirling, and fourteen days later had an attack of "shingles" involving the back of the head, the neck, the auricle, and lower part of the face on the left side. This was accompanied by deafness and giddiness, tendency to fall to the left, and later followed by paralysis of the left facial nerve. (It is interesting to note in passing that her sister-in-law had had an attack of "shingles" on her body some three months earlier, as this disease has been known at times to exhibit an apparent seasonal or epidemic incidence.)

On examination the nose, pharynx, and naso-pharynx were

found normal and healthy. The teeth required attention. There was a large, old, inferior defect in the right tympanic membrane, now quiescent, attributed to an attack of scarlet fever thirteen years ago, otherwise this ear was healthy. On the left side the external effects of the herpetic eruption had disappeared, but examination of the aural fundus showed an opaque drumhead with a rough glistening surface and marked injection of the malleolar plexus. Range for whisper on this side, 7 yds. No spontaneous nystagmus or deviation. No antral or mastoid tenderness. Total paresis of the left facial nerve. During the deafness at the commencement of the attack the patient volunteered that "voices appeared shrill." (Was this in any way associated with paresis of the stapedius muscle?)

She was already having electrical treatment when I saw her, and I advised that this should be continued. Her recovery was slow, but by March of the following year the paresis was much improved and in another three months all symptoms had disappeared. As far as is known she had and has had no further attack.

Mrs. S——, aged thirty, came to see me January 2, 1912. She was the wife of a doctor who stated that she had had carache on the left side on and off for the last fourteen days with a good deal of general malaise, and an herpetic eruption on the nose.

Nothing abnormal was found on examination of the interior of the nose, mouth, or throat, and the right ear was sound and healthy. On the left side the anterior auricular area and apex of the mastoid were tender; external otitis rather obscured the view of the fundus, but the tympanic membrane could be seen to be intact and mobile. Definite weakness in closing the left eye. The patient also said she had tingling over the back and side of her head on the left and noises on the same side "like a band playing," and giddiness. No spontaneous nystagmus or deviation or antral tenderness. Treatment on general lines and topical applications were suggested, and within a few days the pain and discomfort were very much relieved. A month later, however, she had a similar attack on the opposite side with noises, giddiness, and deafness lasting about fourteen days, during which small vesicles appeared on that drumhead. The acute symptoms soon subsided, but for many months she complained of intermittent smarting, stinging, and shooting in the ears, which apparently could be described as more annoyance than discomfort, but most irresponsive to local treatment and salicylates internally. It was some eighteen months or more before she thoroughly recovered.

In both these cases the question of some inflammatory middle-ear lesion requiring operative treatment arose and was the chief reason for the consultation. This aspect of differential diagnosis was amply elaborated in the discussion of the Otological Section and the editorial above referred to, and does not here need repetition. One point, however, was apparently omitted which may deserve notice, that is the absence of middle-ear tenderness and pain on compression and aspiration. In each instance most of the typical signs of acute inflammatory otitis media were present, including in one case the appearance of the fundus, but the fact that here the membrane was freely mobile and movement was painless at once suggested a lesion limited to the drumhead and not involving the drum cavity.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

February 5, 1915.

DR. WILLIAM HILL, *President of the Section, in the Chair.*

The After-treatment of Submucous Resection of the Nasal Septum without the Use of Splints.—Sir William Milligan.—Sir WILLIAM MILLIGAN said that at the last meeting of the Section Dr. Dan McKenzie showed new splints for the after-treatment of cases in which a submucous resection of the nasal septum had been performed, but he considered that if these cases could be treated without a splint at all it would be a considerable advantage. The comfort to the patient was undoubtedly greater, and continuous drainage from the nose was better ensured. For some time he had not used any splints. After the requisite bone and cartilage had been removed he used Whitehead's varnish,¹ a varnish used by Mr. Walter Whitehead after his operation for removing the tongue, painting it on the two perichondrial surfaces, and then bringing those surfaces together. It caused the muco-perichondrial surfaces to adhere. Though he had used this method for a considerable time, he had not seen a hæmatoma ensue in any case, and patients expressed their appreciation of being able to breathe through the nose immediately after the operation. The opinion of the nurses was that recovery was more rapid under this plan than when splints were employed.

Dr. WATSON-WILLIAMS said that when, as often happened, there were complicated conditions present, *e. g.* more or less active sinus trouble, packing of the nose was a cause of considerable anxiety; sometimes one did not know whether to deal with the septum or the sinus first. Again,

¹ Gum benzoin, 4 dr.; styrax, 3 dr.; socotrine aloes, 40 gr.; balsam of Tolu, 1 dr.; iodoform, 4 dr.; pure ether, 5 oz.

the sinus might be difficult to pack and operate on through the nose when the septum was much deflected. Hence dispensing with packing became a most useful procedure.

Dr. DUNDAS GRANT said this varnish seemed to be the one thing wanted for the prevention of the formation of hæmatoma without plugging. He had in some cases passed stitches from one side to the other, and this had acted very well. Another plan which answered well was to make a perforation far back on the side opposite to that of the original incision, to allow of the escape of blood. It was in the cases in which the technique seemed most successful that hæmatoma seemed most likely to form. He remembered having tried some ingenious clamps devised by Brünings, but his own patients could not tolerate them, and they were given up.

Dr. DAN MCKENZIE asked whether, in the cases in which an artery was cut low down in the nasal crest, the varnish sufficed to control the hæmorrhage. The packing was used to prevent a hæmatoma after the effect of the adrenalin had worn off.

Sir STCLAIR THOMSON said that dispensing with plugging was suggested in America some eighteen months ago, and urged in the *Laryngoscope* and other journals. He had never put in plugs when there were sinus complications, and the septum did very well. For some five years now his practice had been to do a resection of the septum, and then put the septum practically entirely back again, removing only any redundant pieces. He made a kind of mosaic of the portions and put them back, packing them between the two flaps. To keep them in position for the first twenty-four hours he put in small rubber sponge plugs, and there was seldom any complaint.

Mr. HERBERT TILLEY said he had not tried the varnish in such cases, but it was very useful as a styptic antiseptic in operations on the larynx for the removal of malignant disease, in order to stop bleeding in the deep posterior part of the removed cord. The evil of the splint was the discomfort to the patient during the first twenty-four hours. For the last six months he had been using an oval drainage-tube, through which the patient could breathe. It was anchored in position by a piece of plaster on the cheek.

Mr. HOPE said he had never used an ordinary hard splint for these cases, but employed iodoform gauze soaked in vaseline, and he did not find patients complained of it. He had also used a small piece of rubber tubing on the floor of the nose, and packing on the top of it; but some patients complained of that.

Sir WILLIAM MILLIGAN replied that patients complained of discomfort even when he used the simplest of splints, *i. e.* a rubber finger-stall lightly filled with gauze and smeared over with vaseline. In answer to Dr. McKenzie, if the naso-palatine artery bled freely, it was best to needle it with a Krause's hook, and then on painting it over with the varnish the bleeding stopped. He was not aware the method had been used in America; he did not believe it had been employed in this country. He had not performed the operation described by Sir StClair Thomson; when he took the cartilage away he was glad to get rid of it. He found that an excellent septum formed from the fibro-cartilaginous structures.

Chronic Lymphangitis of the Tissues covering the Nose.—Sir William Milligan.—The patient was a woman, aged thirty, of healthy history, but at the age of eighteen she had a very bad nasal catarrh.

which disappeared after lasting some months. Three years ago she began to complain of her nose becoming enlarged. The interior of the nose did not seem to depart much from the normal, nor did the pharynx or nasopharynx. He suggested it was a chronic lymphangitis. If any reasonable treatment could be suggested he would take her into hospital and carry it out.

Dr. WATSON-WILLIAMS asked whether sinus affection had been excluded. In the last edition of his text-book he illustrated two cases of somewhat similar lymphangitis of the nose, in one of which the lip was involved; and in both he found latent sinus trouble. There might not be discharge or gross evidence of that, but careful washing out of the antra and culturing the discharge might give a clue. He did not think the sphenoidal sinus was likely to be at fault. The chronic condition was more likely to cause trouble than the more acute and manifest conditions, in which many polymorphs were poured out.

Mr. STUART-LOW said that some years ago he had a similar case (a young lady) under treatment. There was considerable improvement in the external appearance of the nose after repeated scarification of the interior of the nasal passages; this caused very free bleeding at the time and resulted in great diminution of the swelling and of the redness of the nose.

Dr. SYME did not think this condition was chronic oedema such as was met with in disease of the sinuses. From the photograph he would judge it was a case of simple lymphangitis. He had seen the auricle in the same condition. More harm than good was likely to follow interference.

Dr. DUNDAS GRANT asked whether anything in the way of elastic compression could be devised. Such compression had been found of benefit in elephantiasis or lymphangitis of the leg when Martin's india-rubber bandages came into vogue.

Mr. HERBERT TILLEY suggested that before attempting any operation an attempt should be made to obtain a culture from the blood; that might give an indication as to the possible source of the trouble, and an autogenous vaccine might be made. After the South African war he had a case involving eyelids and forehead; the sinuses were opened by another surgeon and nothing abnormal found. Eventually, an anti-streptococcic serum did most good, an attenuated form of that micro-organism having been discovered in the exudations of the swollen areas.

Dr. BROECKAERT (Ghent) said it would be well, in this case, to take out a wedge and make use of flaps. He considered that the scars would not be very disfiguring afterwards.

Sir WILLIAM MILLIGAN replied that he transilluminated the patient, but did not make a puncture. He would have a skiagram of the frontal sinuses taken. He had thought of taking a culture, but had not yet done so; but he proposed to adopt this suggestion at once. He did not think the case sufficiently severe to justify the carrying out of Dr. Broeckart's suggestion. The doctor who sent the case said that diathermy had been tried. He was grateful for the various hints, and he was inclined to try Mr. Tilley's suggestion first.

A Nasopharyngeal Fibroma enucleated by a Curved Dissector and the Finger.—E. D. Davis.—A boy, aged fourteen, was sent to hospital on July 20th, 1914, for the removal of an adenoid growth. Six years before a tonsil and adenoid operation had been performed at a throat hospital. The patient was suffering from nasal obstruction, with

slight deafness, but there was neither epistaxis nor pain. The post-nasal mirror showed a large, globular, smooth swelling, filling the nasopharynx, and attached to the body of the sphenoid. The tumour could be seen from the right anterior nares, and almost completely obstructed the corresponding choana. It was elastic, firmly attached, and had caused absorption of the posterior edge of the vomer and hard palate. He was examined under an anaesthetic, and the growth was considered to be a sarcoma. A hundred milligramme radium emanation tube was inserted into the tumour through the right anterior nares, with no result. A section of a piece of the growth was found to be a fibroma. In August, 1914, the tumour was completely enucleated with a strong dissector and the finger without splitting the palate. The operation was considerably facilitated by the administration of intra-tracheal ether.

Mr. HERBERT TILLEY asked whether "enucleated" was the right term to use. If the tumour was enucleated, he would like to hear what had been done with the capsule. He believed these growths gradually grew from a broad fibrous base.

Dr. FITZGERALD POWELL supported Mr. Tilley's remarks. Considerable force was required to remove these fibromata with a raspator, as they were usually firmly attached to the base of the skull and extensive in their attachment. Of course, such methods were only suitable for small growths, and would be quite useless in the larger fibromata, which were fixed to the basi-sphenoid, pterygoid plate, etc.

Dr. DUNDAS GRANT for these cases used a periosteal elevator, passing it down through the nose, and guiding it with his finger to the under surface of the sphenoid, and possibly to the adjoining pterygoid plate. He used considerable force, so as to detach the periosteum with the tumour. In his cases the attachment had been very widespread. The cases where the growth arose from the antrum should, of course, be differentiated from these. He believed these fibromata grew from the periosteum, and he asked whether Mr. Davis passed the elevator through the nose or behind the soft palate. Doyen devised an instrument for working behind the soft palate, but he (the speaker) had found it better to work through the nose.

Dr. D. R. PATERSON said he had several cases of the kind, which he operated upon in the way Dr. Dundas Grant had just described. The growth was seized by a vulsellum from below and traction made by an assistant. A long, narrow, periosteum elevator was then passed, first through one nostril, then through the other, towards the nasopharynx, one or two fingers of the left hand being pushed behind the soft palate to the same spot. The seat of the attachment was in this way dealt with, and the growth detached and pulled away. There was very little hæmorrhage, and the result in each case was most satisfactory.

Sir WILLIAM MILLIGAN said the case recalled to his mind that of a boy upon whom he had operated fifteen years ago by means of a long carpenter's chisel, $\frac{1}{4}$ in. broad, using it as an elevator passed through the nose. The growth was levered out; there was no capsule. Using the finger in the nasopharynx as a guide, he regarded it as an excellent method, and he had done it several times since.

The PRESIDENT said the method employed must depend upon whether the growth was loose or was firmly attached over a wide area.

Mr. E. D. DAVIS replied that he first struggled with the growth by attacking it through the nose with snares and a small dissector. Then he tried lifting the soft palate with a retractor, which gave him a good view of the tumour. He used Doyen's raspator, and after reflecting

the mucous membrane, to his pleasant surprise he found the right layer and the tumour peeled out quite easily with the finger. He used the term "enucleated" metaphorically, and only in the sense in which it was applied to the removal of a prostate. He also attempted to remove it with Sir StClair Thomson's adenoid forceps, and then with a huge nasopharyngeal forceps, but could not make any impression on it. Intratracheal ether was a most useful anæsthetic and greatly facilitated the operation. At the conclusion of the operation the bleeding was so slight that he did not plug the nasopharynx, but this had to be done four hours later.

Post-mortem Specimen of a Pituitary Cyst opened by the Killian-Hirsch Operation.—E. D. Davis.—A man, aged thirty-seven, was sent for operation to relieve progressive blindness. In April, 1914, the patient was seen by Mr. Treacher Collins, who detected optic atrophy and signs of hypopituitarism. A skiagram revealed a large sella turcica with absorption of the dorsum sellæ. July 26: The Killian-Hirsch operation was satisfactorily performed, but the hæmorrhage on incision of the dura was profuse. On the next day hemiplegia developed, with loss of speech, paralysis of the right face, right arm and leg. July 30: The sight improved and the patient could read a newspaper. August 12: Severe occipital headache and restlessness occurred. Temperature, 103° F. Two days later the temperature was normal and remained about the normal for nine days, and then a similar attack of pain, restlessness, with high temperature occurred. September 11: About seven weeks after the operation, the patient died with symptoms of meningitis, but the paralysis of the leg had practically disappeared.

A *post-mortem* examination revealed a cherry-red cyst projecting between the optic nerves into the anterior fossa of the skull, with the tail end of the cyst lying immediately over the opening made by the operation on the floor of the sella turcica. There was considerable absorption of the dorsum sellæ and basal meningitis.

The cyst, with microscopy, perimeter, and temperature charts and skiagram, are shown.

Sarcoma of the Pituitary Body treated by the Killian-Hirsch Operation.—E. D. Davis.—A commercial traveller, aged twenty-three, complained of right frontal and temporal headache, at first spasmodic, and then continuous, of two years' duration. July, 1912: The eyes were examined at an ophthalmic hospital and found to be normal. At a later date, an adenoid operation was performed for nasal discharge at a throat hospital. February, 1913: Retro-bulbar neuritis was diagnosed. The right eye was affected first, then the left. The neuritis was considered to be caused by sinus suppuration, and a nasal operation was performed, when apparently the left middle turbinal was removed, but no relief from the headache or nasal discharge was effected. February, 1914: Sent home from Ceylon for frontal sinus operation, as headache was now continuous and worse. June, 1914: Central optic atrophy and posterior synechia were detected, and the patient was sent for an examination of the nose. The nose and nasal sinuses were normal, with the exception of absence of the left middle turbinal, and the drying of mucus in that position. Acromegaly was then diagnosed by the large hands, feet, lips, and jaw, and by his general appearance. He was almost distracted by continuous headache. Pulse, 80. Temperature, 97° to 98.4° F. X-ray photographs of the large sella turcica, etc., taken before

and after operation, are shown. Skeletal changes with ununited epiphyses were marked. Wassermann reaction negative. Lumbar puncture: Low tension, small lymphocytes in excess. No relief of headache. Urine normal. Sugar, tolerance test not done. Fields of vision: The perimetric charts are shown. June 17: The Killian-Hirsch operation was performed with no relief, and later, increase in the loss of sight of right eye. Pieces of glandular pituitary with proliferating cells were removed. On August 5, Mr. Percy Sargent attacked the growth by raising large parieto-frontal osteoplastic flap, including the removal of the roof of the right orbit. The brain was elevated, and an easy and clear access was obtained to a cherry-like growth projecting between the two optic nerves. Severe hemorrhage occurred when an attempt was made to remove the tumour. Patient died the same day. A piece of the large cystic growth projected into the sphenoidal sinus through the opening made at the first operation.

Post-mortem Specimens of a Malignant Growth of the Pituitary Body.—E. D. Davis.—A laundress, aged fifty-two was admitted for symmetrical ophthalmoplegia of about eighteen months' duration. A pale, bedridden woman of slow cerebration, and with the appearance of a hypo-pituitary case with slight cedema of the upper eyelids. Complete paralysis of the third, fourth, and sixth cranial nerves on both sides. Pupils equal, of moderate size with no reaction to light or to accommodation. Optic discs and sight normal. Weakness of both legs. Skiagram: Huge sella turcica and opaque sphenoidal sinuses. Nose and ears normal, but aspiration of the right sphenoidal sinus with a Watson-Williams syringe and straight trocar resulted in a syringe-ful of old and recent blood which suggested a growth. The Killian-Hirsch operation was considered inadvisable. The specimens show a large soft growth of the pituitary body which has eroded the sella turcica and dorsum sellæ. The tumour has extended laterally and compressed the cavernous sinus and nerves, and has also burst through into the nasopharynx. The sphenoidal sinuses are filled with growth. Secondary growths are present in the omentum.

The PRESIDENT said that when he had used the term "Killian-Hirsch operation" Hirsch rather objected, because Killian had never operated for a pituitary lesion. He (the President) used the term to indicate the route taken, as Killian's submucous septal operation was first performed preparatory to opening the sphenoidal sinuses and the anterior wall of the sella. It was thus sufficient to speak of the Hirsch operation in this connection.

MR. HOWARTH said that members would have been struck by the fact that these cases were usually shown as *post-mortem* specimens. He was, perhaps, fortunate in having operated some two years ago upon a case which was still alive. It was not generally the fault of the surgeon that so many cases were fatal, but was due rather to the fact that the cases were unsuitable for this particular operation. The operation of sellar decompression was a good one if there was a tumour in the sella turcica, below the diaphragma sellæ: but one was often largely dependent for diagnosis on the physician and the ophthalmologist, and sometimes they asked one to operate in cases where the tumour was not in the sella. If the tumour was an interpeduncular one it would be above the diaphragma sellæ, and this operation would not relieve the condition. Still less would it do so if the tumour was a pontine one lying in the dorsum sellæ. If, however, one hit off a case of true pituitary tumour which was

confined to the sella turcica, the operation was useful. His successful case was one of these. The pathologist who examined the piece of growth that was removed said that it showed a simple hyperplasia of the pituitary body. The patient was much benefited by the operation. He could recall three fatal cases, in two of which the tumours were interpeduncular and one in which it was pontine.

The PRESIDENT had recorded a case¹ which died from hæmorrhage some hours after operation: *post-mortem*, it was found to be an unsuitable case for operation. One of Mr. Davis's cases was that of a cyst in the pituitary fossa and above the diaphragma sellæ, and that kind was often relieved by this form of decompression. Mr. Graham had operated upon a case which did very well for two months, but he had to do a second operation, and post-mortem examination showed it was not a favourable case for obtaining substantial decompression by the nasal route, owing to the amount of intra-cranial growth above the diaphragma sellæ.

Dr. SYME said Mr. Davis's "hard luck case" ought to have recovered, and he suggested that these patients should be kept in the sitting posture after operation, to allow of better drainage than could take place in the recumbent posture.

Mr. DAVIS replied that the cyst case was disappointing, for the cyst proved to be beyond his reach. At that operation one would have liked to have passed the finger into the cranial cavity.

Laryngeal Obstruction following Specific Infection in a Young Man.—W. H. Kelson.—The patient, who is a meat salesman, was sent to the exhibitor owing to his difficulty in breathing. He acquired specific disease in 1904, and was successfully treated for this by Mr. Shillitoe, marrying in 1907, and having three healthy children. His voice, however, which was affected in the early stages of his complaint, has never recovered; and this winter the breathing has been much embarrassed.

On examination, fleshy masses resembling pachydermia were to be seen just below the ventricular band and in the inter-arytænoid space, and the whole larynx was much congested. After cocaineisation there was seen to be a good deal of subglottic swelling. After the use of vapour benzoin co. and alkaline lotion the swelling somewhat abated, but as the breathing is still affected the question arises whether any operative measure is desirable, and if so, of what nature.

Dr. ADOLPH BRONNER suggested the use of "606." He had seen a marvellous improvement follow from it in a case in which the tonsil was similarly affected.

Dr. JOBSON HORNE considered the condition might be described as *pachydermia laryngis diffusa*. The condition was rare; a similar case had not been brought before them for a great many years. About twenty years ago, in conjunction with the late Prof. Kanthack, he exhibited before the Laryngological Society of London the larynx from such a case, in which the pachydermatous excrescences were perhaps more diffuse and extensive, reaching to the trachea, and had caused death by suffocation. The description of the case would be found in the *Proceedings of the Laryngological Society of London*, May, 1895, ii, pp. 82-83. The specimen itself was placed in the Museum of St. Bartholomew's Hospital. The case before them was distinct from the cases of tertiary syphilis of the larynx with which they were all familiar, possessing gummatous infiltration and ulceration. Those of them who were practising laryngology before

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxix, p. 39.

the days of salvarsan could call to mind the gratifying results obtained in such cases by iodide of potassium and perchloride of mercury without operative measures. In the present case there was not a loss but an increase of tissue, and it might be necessary to resort to surgical treatment.

MR. WHALE said he showed a very similar case six months ago, and under "606" it cleared up entirely. He saw the woman a fortnight ago, and she was then well.

DR. HARMER asked whether any member had, in these cases, tried the effect of intravenous injections of perchloride of mercury. It was suggested, some time ago, that by using 1 in 1000 perchloride of mercury, dissolved in normal saline solution, and by giving 5 to 15 c.c. intravenously once a week, as good results were obtained in tertiary syphilitic conditions as those produced by salvarsan. This treatment had given good results in the few cases tried at St. Bartholomew's Hospital. It was an easy treatment, and perfectly safe.

MR. E. D. DAVIS said he had had two cases of a similar kind. In one he had to perform tracheotomy, and then gave neo-salvarsan. There was a complete sequestrum of one arytenoid. The patient had two doses, and did very well. The other was a case of perichondritis, in which tracheotomy seemed inevitable: but he gave neo-salvarsan, and the condition cleared up without the necessity for tracheotomy.

THE PRESIDENT said he supposed all were agreed that in syphilitic cases surgical operation should be regarded only as a *dernier ressort*.

DR. KELSON replied that he was grateful for the suggestions, and he would put them before the patient. Whether this condition was syphilitic or post-syphilitic was unknown. Wassermann's reactions had not been done recently.

Fixation of Right Crico-arytænoid Joint; (?) Traumatic.—**W. M. Mollison.**—Male, aged twenty-seven, attended hospital in July, 1914, on account of a cough of a few days' duration, thought to be due to the inhalation of a lemon pip. There was no evidence of this at all, and he soon recovered. The fixation of the right vocal cord and the very prominent and apparently displaced right arytenoid were, however, noted; the Wassermann reaction then, as now (January, 1915), was negative. There is a scar in the neck, of an operation performed ten years ago for removal of a goitre. His hoarseness certainly dates as far back as the operation, but perhaps even antedates it.

DR. SYME said he exhibited a similar case before the Scottish Otological and Laryngological Society last May. It seemed to be congenital, and this case also appeared to be congenital. He asked how the tilting of the arytenoid could be accounted for. He found the same displacement in his own case. This could not be accounted for by traumatic paralysis.

SIR WILLIAM MILLIGAN asked whether Mr. Mollison associated this condition with the operation. He thought these cases were not very uncommon. He had seen a case in which the condition was bilateral. An operation was done many years ago, and one cord became paralysed. Then the other lobe of the thyroid was removed a few years afterwards, and paralysis ensued on the other side. The patient was in such a bad condition with abductor paralysis that he had to do tracheotomy. He did not know whether there was an injury to the nerve at the time of operation, or whether cicatricial contraction ensued afterwards.

DR. FITZGERALD POWELL said he had seen cases in which this condition had occurred in goitre previous to operation: the gland had

become inflamed and adhesions had been formed, involving the recurrent nerve. He thought the fixation of the cords was not uncommon in goitres before operation.

Dr. **JOBSON HORNE** agreed with the previous speakers as to the frequency of fixation of a vocal cord in cases of goitre which had been operated upon; and he also agreed with the statement in the notes of the case that it, perhaps, antedated the operation. In this case he did not regard it as traumatic in origin. If it had been traumatic one would have expected, after this lapse of ten years, to have seen some atrophy of the vocal cord and arytaenoid affected, but in this case there was some enlargement and prominence of the arytaenoid region of the affected side.

The **PRESIDENT** said this was the typical condition met with when there had been injury to one nerve either before or during a goitre operation: perhaps after about one in ten goitre operations there was some paralysis in the larynx. If one fact more than another was apparent, it was that in the traumatic post-paralytic condition there was contracture, in the same way that a fixed knee following paralysis got out of position. The last thing he would expect would be to find the arytaenoid in a normal position after post-paralytic contracture. He had exhibited a case in which the joint was fixed and displaced in the same way. The contracture drew the arytaenoid forward, so that, as in this case, the healthy side of the glottis was the longer. In the case now exhibited the arytaenoid was, he thought, larger and more prominent than usual. In his own case removal of a portion of the arytaenoid was performed, with rather good results: hæmorrhage prevented him getting the whole arytaenoid away, however. Excessive bleeding was common in goitrous patients.

Mr. **MOLLISON** replied that he called it fixation because that was the condition. At some time the patient had had paralysis of the cord, and fixation of the crico-arytaenoid joint had taken place subsequently. He did not agree that the arytaenoid was enlarged, but thought the appearance due to displacement. In examining a large number of normal larynges one now and then saw a slight degree of this displacement. Sir **StClair Thomson**, who had now left, wished him to say he looked at the case and thought it unnecessary to assume that the nerve had been damaged at the operation: it might have become involved in the scar after the operation. The hoarseness might have come on a short time after the operation. The voice was now good, and he had not contemplated any treatment.

Report upon Sir StClair Thomson's Specimen of Laryngeal Growth, from Case shown December, 1914.¹—**S. G. SHATTOCK.**—"In my opinion the specimen is an early squamous-cell carcinoma. The section marked \times is the best. Besides the fact that the epithelium takes the form of ingrowths, there are other characters to notice, viz., the presence of cell-nests; the great size of many of the cells and their nuclei; the presence of more than one nucleus in many of the cells; the infiltration of Unna plasma cells about the lesion."

(Signed) **S. G. SHATTOCK.**

Pachydermia Laryngis.—**W. Jobson Horne.**—At the previous meeting, in the course of a discussion upon a case of epithelioma of the larynx and the microscopic sections of the growth removed, Dr. Jobson

¹ **JOURN. OF LARYNGOL., RHINOL., AND OTOL.,** April, 1915, p. 161.

Horne remarked¹ that the sections as seen upon the lantern screen, and which he had not seen under a microscope, reminded him of sections of pachydermia of the larynx, which he would be pleased to exhibit at a future meeting. He now demonstrated these sections and pointed out that pachydermia of the larynx, as is known, may be *pachydermia laryngis verrucosa* or *pachydermia laryngis diffusa*. The former is the clinical condition more commonly known through the text-book descriptions, but the latter is of equal or of greater importance clinically as liable to simulate, or to be part and parcel of, the more serious disease, epithelioma of the larynx. *Pachydermia simplex* is, therefore, a condition to be eliminated in the differential diagnosis of cancer of the larynx.

Dyspnœa. Perichondritis. Tumour (?) of the Mediastinum.—

W. Stuart-Low.—A man, aged fifty-three, was sent on account of increasing difficulty of breathing, especially on exertion: for some weeks he had been liable to attacks of nocturnal dyspnœa. He was at once admitted as an in-patient, having had a dyspnœic recurrence of such severity that the necessity for tracheotomy seemed imminent. There was a fulness in the neck over the left side of the trachea, filling out the lower part of the carotid triangle, and a swelling over the left side of the thyroid cartilage, which was tender on pressure. The vocal cords were somewhat suffused, but the movements were normal. A livid bulging was observed under the left vocal cord, extending downwards in the trachea. Dry cupping, applied over the left side of the thyroid cartilage, relieved the difficulty of breathing. This has been repeated twice daily for a fortnight. The exhibitor has recently employed dry cupping in a variety of laryngeal cases with advantage. The subglottic swelling disappeared under this treatment, and the swelling on the left side of the trachea was also reduced. The Wassermann test was found to be positive. Iodide of potassium and mercury have been given in increasing doses and neo-salvarsan intravenously on three occasions. A skiagram revealed a large mass in the chest. There are no indications of pressure on the phrenic or vagus. A second skiagram was taken a week ago (both skiagrams exhibited). It is very remarkable that there are no indications of pressure on nerves or veins, such an extensive growth being present.

The PRESIDENT asked whether Mr. Stuart-Low had had advice as to whether the condition was possibly aneurysm, as there was decided pulsation, and the skiagram led one to think of that lesion; though he (the speaker) could show skiagrams suggesting aneurysm where the condition was really mediastinal growth, and *vice versa*. In mediastinal growth there might be communicated pulsation. In this case the outline in the skiagram was very sharp, and was, in his opinion, much more suggestive of aneurysm than of growth. The case ought to be shown again if there were further developments.

Dr. DUNDAS GRANT said the pulsation and the tracheal tugging strongly suggested aneurysm, but it was not absolute proof, as shown by a recent case in which tracheal tugging was very marked, but Dr. Inman had found the Wassermann reaction negative, and as a pathologist he held that this negatived aneurysm: in point of fact, it was a mediastinal new growth. In the present case the Wassermann reaction was positive. The complete absence of paralysis of the left vocal cord was an interesting hiatus, but this did not exclude the possibility of aneurysm.

Dr. DAN MCKENZIE, alluding to the difficulty of diagnosing pulsating

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., April, 1915, p. 163.

tumours at the root of the neck, recalled a case which came under his care four or five years ago, a weak-minded girl, aged fifteen, with a tumour in the thyroid region of the exact contour of the thyroid gland, and pulsating. He thought it was goitre, and as it was causing trouble in swallowing, and there was also difficulty of breathing, he decided to remove it. It was easily freed from its connections, and the capsule was smooth. On cutting through the capsule he found that he was inside a dermoid cyst which extended down behind the sternum into the anterior mediastinum, and was adherent to the aorta, from which pulsation was imparted. He did not feel justified in attempting to dissect it out. The girl got well from the operation, but naturally the tumour still continued to discharge dermoid material. It was a very rare condition, and rather a startling one to encounter.

Dr. FITZGERALD POWELL asked whether the two pulses were equal, and whether a pulse tracing had been taken.

Dr. KELSON said the man was evidently suffering from active syphilis, and he had what looked like syphilis of his thyroid. The tumour he regarded as a gummatous mass in the chest. The only point against that was the absence of response to anti-syphilitic remedies, though that did not put gumma altogether out of court. Absence of pressure signs with such a large mass was rather in favour of syphilis.

Dr. SYME suggested that abductor paresis existed in the case on the right side.

Mr. STUART-LOW replied that Dr. Purves Stewart had examined the case and was of opinion it was not aneurysm. Dr. Ironside Bruce and the physicians at Charing Cross Hospital expressed a similar opinion. There was no pressure anywhere, and it was described as an infiltrating neoplasm, of very slow growth. It could not be dermoid, because the patient was a hard-working man and had been at work until a few weeks ago. The two pulses were equal. It was generally thought that it might be a gummatous infiltration, but it must be remembered that the man had had iodides, mercury, and neo-salvarsan without improvement. He had not heard of there being any impairment of vocal cords until Dr. Syme mentioned it. The larynx was now normal. He would report subsequent happenings.

Epithelioma of Pharynx and Tongue.—W. Stuart-Low.—A man, aged forty-eight, who came to the clinic complaining of a hard swelling in the neck, and pain in the throat and tongue of three months' duration. The middle and left sides of the base of the tongue were felt to be stony-hard, and the uvula, lower and left half of the palate, and left side of the pharynx, were thickened and firm to the touch. Dr. Wyatt Wingrave's report pronounced the growth to be a rapidly growing epithelioma. The infiltration and induration being so extensive as to make it inoperable, diathermy was resorted to, the first application being made on January 14. Six punctures were made—two in the palate, two in the lateral wall of the pharynx, and two in the base of the tongue. There was so very little reaction, and the man was swallowing so much better five days later, that a repetition of these punctures was made a little way off from the original places of puncture. In a week, more punctures were made into those parts of the tongue and pharynx that felt the hardest to the finger. The cutaneous structures over the hard mass in the neck were incised and reflected, the hard glands were punctured in three places, and the skin incision stitched up. The man says that he has less pain and is swallowing better.

Epithelioma of Left Tonsil and Adjacent Part of Tongue after Operation (Specimen shown).—C. I. Graham.—Male, aged fifty-six, noticed pain and difficulty in swallowing about mid-December, 1914. It was equally difficult to swallow solids and liquids, but solids produced more pain. He was admitted to hospital on January 6 with an ulcer confined to the lower pole of the left tonsil and a hard nodule in the adjacent part of the tongue. There was a hard mass, the size of a walnut, at the level of the tip of hyoid beneath the left sterno-mastoid. There was no limitation of the tongue movements, and a No. 12 cesophageal bougie passed easily to the stomach. Pyorrhœa was well marked. All the teeth were removed on January 7, and operation took place on January 13. The left anterior triangle was dissected clean, including the posterior part of the digastric triangle. No vessels of importance were tied. The left cheek was then split, and the left faucial arch and a considerable portion of the tongue were cut away in one piece. The wound in the neck was completely sutured except for one drainage-tube at the lower angle, and another at the level of the hyoid. The cut edge of the tongue was united to the alveolar mucous membrane, and the gap in the tonsillar region was reduced by means of catgut sutures. There was very little hæmorrhage, in spite of the fact that no important arteries were tied, and the intra-tracheal administration of ether made the operation most comfortable. Laryngotomy was performed four hours after operation on account of dyspnoea. There is a sinus at the left angle of the mouth which is rapidly disappearing.

Epithelioma of the Tonsil.—W. Jobson Horne.—The patient, a married woman, aged forty-three, for years on and off had had an uncomfortable stuffy feeling at the back of the nose and throat, getting no ease until "something moved." About five or six months ago the back of the tongue and throat ached and the throat was very dry, so the patient tried painting it with glycerine and tannin. A swelling on the left side of the throat was then discovered; this had got worse, causing pain in the tongue, throat, and ear, and at times dysphagia. The left tonsil, which is enlarged, together with the anterior and posterior pillars, formed a red projecting mass with an ulcerating surface. The swelling felt very hard on palpation. The larynx was not involved.

The case was shown with a view of eliciting opinions as regards treatment, the patient being opposed to an operation.

Dr. DUNDAS GRANT asked whether in Mr. Stuart-Low's case the glands gave evidence of having contracted to any considerable extent under diathermy. If the method would produce that result without breaking down and suppuration it would be a very welcome addition to the means of treatment.

Mr. HARMER said he had never yet used diathermy for treatment of the glands. The cases now shown were interesting, because one saw, side by side, results after diathermy and after radical operation. He had no doubt that diathermy caused much less shock to the patient than a cutting operation, and recovery was more rapid. In regard to results, there was very little to choose. He believed, however, that diathermy would, in the future, when more was known about it, yield the best results. Dr. Horne's case he did not regard as a good one for diathermy, because it infiltrated deeply into the tissues of the neck. But the greater part of the growth could be destroyed, and the patient would have three to six months of happy existence.

Mr. MOLLISON said he had now a case undergoing diathermy very similar to Dr. Horne's, and he had been very disappointed in the results so far. Diathermy had been done three times, and, beyond the fact that the surface of the growth was now looking cleaner, there was very little change. Indeed, the extension downwards into the pharynx was now greater than a few weeks ago. But the glands disappeared under small doses of radium.

The PRESIDENT said it was often helpful to use both radium and diathermy in these cases, if these means were available. Results from diathermy seemed to vary with technique. Even if the small apparatus of Schall was used, it promised well in faucial conditions.

Dr. FITZGERALD POWELL said he regarded Mr. Graham's as a very successful case, and he did not see why the woman should not have the same treatment. If there were a deeper recurrence, diathermy could be used. If untreated, there would soon be a rapid extension.

Sir WILLIAM MILLIGAN said he had seen the injection of a few drops of pure formalin into a malignant tonsil give great relief in a case in which operation was declined. A large slough ensued, and the patient was comparatively comfortable for a considerable time.

Mr. STUART-LOW replied that the reduction in his patient's case was very considerable indeed. He made several punctures, moving the needle about in the tissues, so that a considerable area was treated. Next day it was decidedly softer, and the incision healed immediately after stitching. The patient felt much better for this treatment, the pain being less and the hard, stony glands being much softened and greatly reduced in size.

Mr. GRAHAM replied that his case was more suitable for removal by operation, and he thought that was the best method. He emphasised the extreme comfort experienced by the surgeon when the anæsthetic was administered by the intra-tracheal method.

Dr. JOHNSON HORNE expressed his indebtedness to those who had made suggestions. His patient had definitely made up her mind not to submit to surgical procedures, and he had sympathy with that attitude in this case, as the growth, he thought, was really more extensive than it appeared to be. He would avail himself of Mr. Harmer's suggestion and advise treatment by diathermy.

Bullet Wound of Pharynx, etc.—C. W. M. Hope.—A. B—, whilst resting two miles behind the firing-line in France, was shot in the neck on October 28 by a rifle bullet. He spat up a little blood at the time of receiving the injury. Entrance wound is behind right sternomastoid, $1\frac{1}{2}$ in. above clavicle. The bullet was removed (by incision over it) just below angle of left lower jaw.

On January 8, 1915, marked brawniness of neck on each side of larynx and upper part of trachea was noticed, and a hard mass was felt in the region of right transverse process of lower cervical vertebræ: nodding and rotatory movements of head were limited. Patient was only able to swallow fluids, and that with some difficulty. He had definite weakness of left vocal cord, which was narrower than the other, and had poor abduction. On January 13, 1915, he was examined by direct method, under chloroform. The post-cricoidal pharynx was found to be obstructed by two nipple-like processes of granulation tissue, $\frac{3}{4}$ in. long and $\frac{1}{4}$ in. broad, growing from posterior wall. No abscess cavity or pouch could be demonstrated. The masses were removed by forceps. Within twenty-four hours patient was able to swallow solid food with

ease. January 22: Examined again under cocaine. Tiny tag of tissue found on posterior pharyngeal wall and removed. No stricture of lumen. Patient able to eat anything. Gained 8 lb. in weight in ten days. All swelling of neck subsided except over right transverse processes. Movements of head free. Vocal cord *in statu quo*.

Specimen and Skiagram of a Case of Œsophagotomy.—H. L. Whale.—Gunner S——, drinking the gravy out of a bully-beef tin in the trenches, swallowed this circular piece of tin, which is 1½ in. in diameter, bent and jagged. It was impacted in the coronal plate opposite vertebra D₅. He came under my care eight days later. As his occupation in peace time is to play the oboe, it was necessary to avoid tracheotomy or laryngotomy. The Œsophagus was exposed in the left posterior triangle of the neck and opened. The mucous membrane was found folded around the jagged edges of the tin, making extraction very difficult. An Œsophageal tube was passed, which the patient subsequently was taught to pass for himself for feeding purposes. This tube was used for ten days. The Œsophagus was closed, and the outer wound packed. At the operation the cervical sympathetic and its middle ganglion were clearly exposed, and at several dressings the left pupil was observed to dilate when ribbon-gauze was being packed between the Œsophagus and spine. Recovery was uneventful.

The PRESIDENT said Mr. Whale was to be congratulated on the result.

Mr. O'MALLEY also congratulated the exhibitor on the result because of the difficulty of operating in this region. Two days ago he had witnessed an operation in which a bullet was removed from between the third and fourth ribs, and he appreciated how difficult it was.

Gunshot Wound of the Neck: Injury to Larynx, resulting in Formation of Web.—H. Buckland Jones.—A private, in the Oxford and Bucks regiment, aged twenty-eight, was wounded at Ypres, on October 23, 1914, by a piece of shrapnel casing, about the size of the little finger-nail, which he coughed up two days later. There was dyspnœa for five or six hours; he was in pain for a week and coughed up clots of blood. On admission to hospital on December 17, the case was investigated under the X-rays with negative results. On examination there is a scar on the right side of the neck over the sterno-mastoid opposite the cricoid cartilage. The glottis is closed by a crescentic web occupying its anterior half. The ventricular bands are somewhat thickened. Both arytenoids have equal and almost complete movement: possibly the left is a little more free than the right, except that adduction leaves a chink in the posterior one-third of the glottis.

Sir WILLIAM MILLIGAN said he thought the patient would be best left alone; he doubted whether anything could be done successfully.

The PRESIDENT said he once dealt very well with a web by doing laryngo-fissure and keeping the fissure open by means of a special splint until the wounded edges of the cords healed up. He sutured the fissure three weeks after operation.

Dr. DUNDAS GRANT thought one would only feel called upon to operate if there were stridor or dyspnœa. He did not think the respiration was being interfered with in this case; though if laryngitis occurred now there would be more discomfort than in an ordinary person. Bruinings suggested injecting paraffin into a paralysed vocal cord. He agreed that the web was best left alone for the present.

Mr. O'MALLEY said that eighteen months ago he showed a boy who had a web, and a full crop of suggestions for treatment was made at the meeting. He followed the active advice, but the result was unsatisfactory: considerable oedema ensued, and the web returned to its former condition. He dealt with it endo-laryngeally. He advised Mr. Jones not to take an active line in this case. With regard to the voice weakness, he asked that consideration should be given to an emotional factor.

Mr. WHALE thought it a suitable case for suspension apparatus, if anything were done. From what he had seen of similar wounds in France recently, he thought malingering was a possibility, especially if there was a desire to avoid getting back to the front.

Mr. E. D. DAVIS said he had had two cases, both neck wounds, in which there was functional aphonia. The bullet had gone through the pharynx without injuring the larynx in both cases, but whereas one patient recovered the day after being seen, the other had not yet recovered his voice.

Sir WILLIAM MILLIGAN said he had seen, at the military hospital, three cases of functional aphonia in men who had had no injury at all.

Gunshot Wound of the Neck, with Extensive Injury to Larynx.

—H. Buckland Jones.—A private in the Grenadier Guards, aged twenty, was wounded at Ypres on October 21, 1914. He was standing up firing and was surrounded by the enemy, when he was hit in the neck by a bullet. He believes this entered near the tip of a thyroid cartilage and came out behind the sterno-mastoid on the right side. He was unconscious for about fifteen minutes, and then walked to the field hospital. He had difficulty in breathing and speaking for about two days, when the latter improved to a low whisper. Some blood was coughed up for about twenty-four hours. He was admitted to hospital late in December. An X-ray examination showed no sign of foreign body. There was a swelling at the level of the thyroid cartilage in the right anterior triangle, which eventually resulted in suppuration, and was opened and drained. On examination with the laryngoscope no vocal cords are to be seen; the regions of the ventricular bands are occupied by masses of granulation tissue, especially the right.

The PRESIDENT had seen a similar case in a man from the Front. In such cases he supposed an expectant attitude must be adopted for a considerable time.

Mr. BUCKLAND JONES thanked members for their suggestions. In the first case he thought of doing some endolaryngeal operation, but he gleaned that this would not be very hopeful. Perhaps he should try some voice-training method first. In the second case there was much perichondritis. Certainly there was some improvement after the abscess was drained, but there seemed to be much granulation tissue in the larynx. He proposed to do nothing for the present until the perichondritis had subsided.

Shrapnel Wound of the Neck; Injury to Buccal Cavity; Exit beneath Angle of Jaw on opposite Side.—W. Jobson Horne.—The patient, a Grenadier Guardsman, on November 7, 1914, at Ypres, was wounded by a shell in the left thigh, the occiput, and the left side of the neck. There was also the scar of a wound on the right side of the neck, which was regarded as the point of exit. The trench was blown in by the bursting shell, and the man was buried in the *débris*. He was unconscious for about twelve hours. He was in hospital in Boulogne

when he recovered consciousness. The mouth contained blood and dirt and broken teeth. He was not able to swallow saliva, and during the nine days he was in Boulogne a feeder had to be used. Whilst he was in Boulogne pieces of shrapnel were removed from the wounds in the neck, at the sites of entry and of exit. From Boulogne he went to Manchester, where he was convalescing until December 19, and then he was on sick leave until January 26. The following day he was sent to hospital on account of pain in the region of the wounds in the neck and disease of the right ear. The wounds in the thigh and occiput had healed and gave no trouble. The injuries to the mouth might have been occasioned by the blowing in of the trench. The X-ray examination of the neck had not so far yielded any definite evidence of a foreign body.

Synechiæ in the Nose treated by Diathermy.—Dan McKenzie.

—The patient is a corporal in a Lancer regiment, who sustained a shrapnel wound of the face four months ago. The ball traversed the face from one cheek to the other, passing through the nose. During the healing of the wound the nasal cavities became blocked by masses of scar tissue, so that when he came under my care respiration was almost wholly conducted through the mouth. The poor outlook for such a patient, if treated by ordinary methods, led me to employ diathermy, the apparatus used being Schall's small variety. The result has exceeded all my expectations. There was an entire absence of reactionary swelling, and the cicatricial tissue has shown no sign of forming again. It is suggested that for synechiæ of the more simple and everyday kind diathermy might with advantage be tried.

Dr. PEGLER said he had just discharged from hospital a soldier who had also been wounded in the nose at Ypres. Deep scarring showed where the lower end of the nose had been almost entirely severed from above and re-attached by sutures (at Rouen); the right nostril was almost completely obstructed by circumferential contractions and thickenings, the left rather less so. As a submucous operation was not practicable, the old routine methods were adopted, and india-rubber tubes were afterwards inserted to maintain an airway. The result was good and permanent on the left side, but the right vestibule he hoped to further improve.

The PRESIDENT raised the point whether diathermy was justifiable in such a condition as this.

Dr. DAN MCKENZIE replied that he would like to add the word "my" before "ordinary methods" in the seventh line of the note. His experience of treatment of cicatricial adhesions in the nose was not good; whatever he tried, the adhesions seemed to form again, but the result in this case had been surprising, as there was no reaction. After cutting or cauterising operations on the nose there were always swelling and œdema, and sometimes granulation tissue formation. This man breathed now even better than he did shortly after the operation. Contrary to his expectation, there had been no necessity to interfere further, as there had been a subsequent slow removal of redundant scar tissue, as the result of coagulation necrosis—an important part of the diathermy process.

Acute Suppuration of the Nasal Accessory Sinuses in Children.—Herbert Tilley.—(a) O. H. B.—, aged thirteen. When aged seven patient had scarlet fever. During the last days of convalescence, pain and swelling commenced over right eye, accompanied by purulent nasal discharge on right side. Œdema and redness over eye

continued. Incision in eyebrow, escape of pus: anterior ethmoidal cells diseased—these were curetted. Frontal sinus opened, but found healthy. Healing of wound by granulation. On December 9, 1914, patient seen again; both eyelids were closed by oedema of upper lids, the oedema extending to vertex. Temperature, 101.5° F. Pain on pressure, most acute over site of right frontal sinus. No nasal discharge. December 10: Old incision opened. Remains of sinus filled with purulent granulation tissue. Sinus walls completely removed, also one fronto-ethmoidal cell. Wound left open and drained: recovery uninterrupted. Sinus seems quite obliterated.

N.B.—Acute frontal sinus suppuration at seventh year and long period of quiescence (six years) until recent recurrence.

(b) *Acute Suppuration of Frontal, Ethmoidal, and Maxillary Sinuses.*—R. P——, male, aged eight, on December 21, 1914, at 5 a.m., complained of severe pain in and around the region of the left eye. Temperature, 102° F. December 23: Pain in eye severe. Conjunctiva reddened. Small reddish, tender swelling below and in front of tear sac. Considerable oedema of left upper eyelid. Left nasal cavity inflamed and much muco-pus. Examination rendered difficult by septum being deviated to left. Upon transillumination left antrum seen to be slightly darker than right. Exploration through inferior meatus established presence of pus in antrum. Continuous hot fomentations ordered. December 25: Eyelids quite closed by oedema of upper lid. All symptoms increased except temperature, which was normal. December 25 to January 10: Symptoms all abated except the swelling in front of lacrymal sac, which was tender, red, and semi-fluctuating. Free discharge of pus from left nostril. January 11: Under general anæsthetic, anterior halves of middle and inferior turbinates removed. Inner antral wall removed. Anterior ethmoid cells broken down with curettes until lacrymal bone and os planum were reached. Frontal sinus ostium enlarged by author's small raspatory. It was not possible to establish any connection between external swelling in front of lacrymal sac and interior of nose. After operation fomentations were continued. The patient has made a complete recovery and is now practically free from any discharge.

The exhibitor thinks this may be the youngest case in which intranasal opening of sinuses has been carried out. Great difficulty was experienced during operation because of deviation of the septum. Killian's speculum had to be employed all the time while the higher sinuses were being dealt with.

(c) *Acute Suppuration in Maxillary Antrum following Measles.*—S. R——, aged ten, female. January 24, 1913: Patient had measles. February 14: Exhibitor saw patient in consultation, when she was suffering from severe pain over left eye, in which region there was marked tenderness on pressure. Temperature, 102° F. Pain on pressure over left canine fossa. Free discharge of pus from left nostril. Nasal mucosa very red in left nasal cavity. Left antrum appeared dark upon transillumination. Exploration yielded a quantity of greenish-yellow pus. No indications of pus from higher cavities: the frontal sinus was irrigated. Irrigations of antrum on four following days, the purulent discharge rapidly giving way to a preponderance of mucus. March 31: Exhibitor last saw patient, when all symptoms had disappeared.

Dr. WATSON-WILLIAMS said Mr. Tilley had done a service in bringing forward these cases, because they emphasised the fact that,

even in children, one could treat these extensive sinus conditions. In the first, though there was no dead space and the condition healed up, there was a recurrence. Surgeons sometimes put down to a "dead space" what might be a re-infection. One saw that the surgeon was not always to blame, for there might be a re-infection from a latent condition. With regard to the intranasal method, it must be remembered that in very young children there might be an opening direct into the frontal sinus from the middle meatus, because the space formed by the development of the ethmoidal cells did not intervene as in adults. He did not think anyone would deliberately open the frontal sinus in such a child unless a skiagram were first taken, and even then it would be risky by intranasal methods.

MR. STUART-LOW said but little pus was now to be seen, and the treatment seemed to have been beneficial; but he took exception to the amount of deformity in one of the cases. In a number of cases he had himself shown he attributed the absence of marked deformity in which this operation had been done to the wearing of a cage which took off the pressure. The use of this cage might have helped in the case of the boy, in whom there was one very great deformity, which would, he considered, be permanent.

DR. SYME said he was not convinced that it was advisable to operate on a child's antrum by the intranasal method, because he had found there was difficulty, even with the ordinary operation in children aged from ten to twelve, in keeping the opening into the nose patent. Antral cases in children should, he thought, be attacked from the canine fossa.

THE PRESIDENT said he did not think Mr. Tilley had carried out more operative interference than the cases demanded.

MR. HERBERT TILLEY replied that Mr. Stuart-Low's argument would not apply to this case, because the child he had referred to had no external dressings beyond lightly applied warm fomentations. In Case (*a*), when, six years ago, the sinus complication followed scarlet fever, it was an ethmoidal suppuration—there was a bulging into the nose and an external abscess. Mr. Hett opened it, and he only explored the frontal sinus, but, finding it healthy, he did no more. When he (the speaker) saw the case in December the edema extended from the upper eyelids to the parietal suture, and there was much tenderness over the right frontal sinus. He re-opened the formal incision and obliterated a diseased frontal sinus and an orbito-ethmoidal cell. In Case (*b*) he operated by the intranasal method because, when opening through a child's canine fossa, one destroyed the nerves supplying young teeth. There was no difficulty in operating through the nose, except that the septum was deflected. Neither had he any particular difficulty in entering the frontal sinus. In the early days of the disease he fomented the eye and forehead for ten days, but later, when the temperature went up, pain returned, and there was a recrudescence of the swelling in front of the eye; he considered that something more radical should be done in order to establish free drainage.

Tuberculosis of Nasal Fossæ.—C. I. Graham.—A female, aged sixteen, who had never had any nasal symptoms, nor any other illness, noticed slight nasal obstruction early in December, 1914, and she was seen at Christmas. There was a slight enlargement of the anterior end of the right inferior turbinal, which was red and granular in appearance, with a slight amount of clear sticky discharge. The left inferior turbinal presented the same appearance, but in a less degree. A small piece was

removed from the right side for examination. She was again seen on January 28, when there was definite ulceration of the right vestibule involving the outer wall, ventricle, and a small area of the adjacent septum. The left inferior turbinal remains practically stationary.

Dr. PEGLER said he hoped Mr. Graham would add the statement that tubercle bacilli had been found in the tissues, and congratulated Mr. Graham on his success.

Mr. GRAHAM replied that the credit of finding the tubercle bacilli was due to Dr. Kettle.

Tuberculous Ulcer of the Mouth.—H. Buckland Jones.—W. M.—, a male, aged thirty, came to hospital on December 31 last, complaining of ulceration of the month, which he had been troubled with on and off for twelve months. On examination a large ulcer with indurated edges was found in the region of right inferior wisdom tooth admitting the tip of the finger and spreading on the adjoining cheek. Some enlarged glands were found on both sides of the neck in front of the sternomastoid. There was a history of a cough and wasting for twelve months. On examination of the chest there was slight dulness over the right apex with prolonged expiration, some bronchophony, and a few coarse crepitations. There was no history of syphilis. A piece of tissue was examined by Dr. Leatham showing numerous giant cells, but no tubercle bacilli. No sputum has been available for examination.

(Unfortunately this patient died of tuberculous meningitis a few days before the meeting.)

Abstracts.

CEREBRO-SPINAL MENINGITIS.

Lundie, A., Thomas, D. J., and Fleming, S.—Cerebro-spinal Meningitis: Diagnosis and Prophylaxis. "British Medical Journal," March 20, 1915, p. 493.

This paper is the outcome of work in the Aldershot command. Cerebro-spinal meningitis is discussed in its three stages: (1) Catarrhal, (2) septicæmic, and (3) meningeal. The first stage is usually detected almost by accident: by examination of all the men sleeping in the room where a case has occurred. The authors use West's swabs, from which they inoculate plates of "nasgar" medium. They find that all carriers have catarrh. Stage 2 is that febrile condition which is undiagnosable, unless it passes on to stage 3. In their conclusions the authors state that the disease is more widespread than is usually recognised: it gives warning of its onset by catarrhal symptoms and often goes no further. In its second stage it may run a long non-malignant course. As an adjuvant to spraying and swabbing treatment, an autogenous vaccine is recommended.

Macdonald Yearsley.

Arkwright, Joseph.—Cerebro-spinal Meningitis. "British Medical Journal," March 20, 1915, p. 494.

The author points out that one of the most outstanding features of epidemics is the isolation or want of ascertained contact between the cases of the disease. Two explanations suggested themselves: (1) An infective

material widely distributed outside the body and remaining active some time (contradicted by the sensitiveness of the meningococcus to ordinary air). (2) Carriers. The latter are discussed in some detail. The portal of entry of the disease is undoubtedly the naso-pharynx. The method for investigating carriers is described, and it is suggested that they should be isolated. The total number of persons who harbour the meningococcus should be looked upon as constituting the true epidemic.

Macleod Yearsley.

Host, E. C., Lakin, C. E., Benians, T. H. C.—Epidemic Cerebro-spinal Fever. "British Medical Journal," March 27, 1915, p. 541.

A preliminary note on the bacteriological study of the disease. This paper is one which scarcely admits of abstraction. It asks the question: Is the meningococcus the primary infective agent? and gives seven points of evidence which supports the affirmative answer. This is followed by: Is the meningococcus merely a phase of the causal organism? It is suggested that at some phase in the life-history of the organism the latter exists in so minute a form in the blood as to be able to pass through the filter bed between the circulatory and cerebro-spinal systems. The author's experiments with filtered urine show this is probable, and that in addition to the detection and isolation of carriers, the urine of patients should be disinfected.

Macleod Yearsley.

Foster, Capt. Michael.—Cerebro-spinal Fever: Diagnosis and Treatment. "British Medical Journal," March 27, 1915, p. 543.

The author's notes are drawn from his experience at the 1st Eastern General Hospital at Cambridge, and embraces twenty-five cases, with a mortality of 20 per cent. In nineteen the meningococcus was recovered from the cerebro-spinal fluid; in the other six the diagnosis was indisputable clinically. A difficulty is that the micro-organism has to be cultivated from the fluid. Symptoms are discussed under the heads of: (1) Retraction of the head; (2) rash; (3) implication of cranial nerves; (4) mental condition; (5) facial aspect; (6) vomiting; (7) muscular rigidity; (8) condition of the sphincters; (9) pyrexia.

As regards treatment, the excellent results of repeated lumbar puncture are pointed out. Serum treatment gave no better results than lumbar puncture alone.

Macleod Yearsley.

Embelton, D., and Peters, E. A.—Cerebro-spinal Fever and the Sphenoidal Sinus. "Lancet," May 22, 1915, p. 1078.

The authors publish these cases to show that empyema of the sphenoidal sinus has a relation, and probably a causal relation, to the infection of cerebro-spinal fever. Their conclusions are: (1) Sphenoidal empyema is associated with cerebro-spinal fever in a causal manner. (2) Cerebro-spinal fever is a meningitis due to organisms entering the meninges from the sphenoidal sinus by way of the lymphatics. (3) Adults are less susceptible owing to a diminished tendency to sphenoidal empyema, as they are not prone to excessive swelling of the mucous membrane and so to closure of the ostia, as is seen in adolescents. It may be advisable to open the sphenoidal sinus in all cases of cerebro-spinal fever: it is certainly advisable to treat the naso-pharynx on the lines used in one of the published cases, when the nostrils were painted with ung. hyd. nit. dil. 5ss, menthol gr. 5, ol. olivæ ad. 3j, and the tonsils swabbed with hydrogen peroxide.

Macleod Yearsley.

PLATE I.



FIG. 1.—Piece of shrapnel embedded in posterior wall of maxillary antrum.

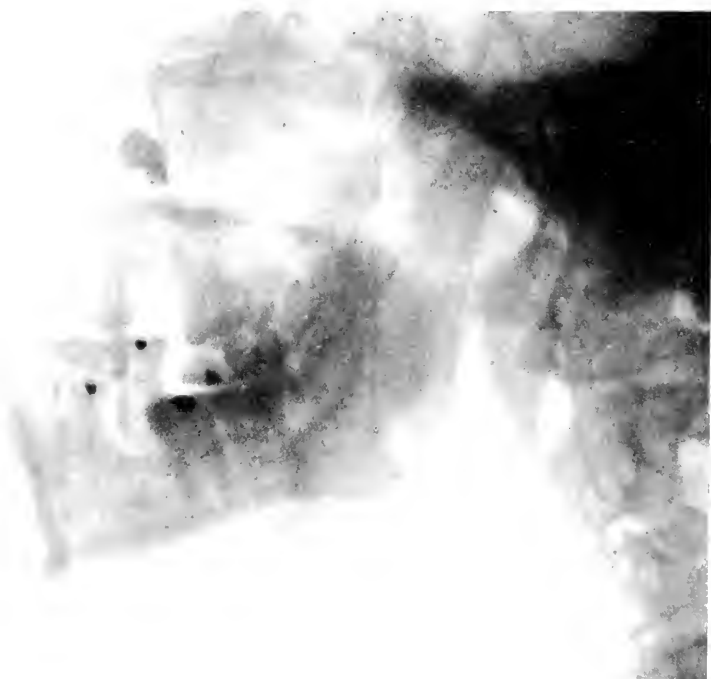


FIG. 2.—Piece of shrapnel in inferior meatus of left nasal passage.

TO ILLUSTRATE MAJOR SIR WILLIAM MILLIGAN AND MAJOR F. H. WESTMACOTT'S
PAPER ON WARFARE INJURIES AND NEUROSES.

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WARFARE INJURIES AND NEUROSES.¹

BY MAJOR SIR WILLIAM MILLIGAN, M.D.,

AND

MAJOR F. H. WESTMACOTT, F.R.C.S.

MR. PRESIDENT AND GENTLEMEN,—The 2nd Western General Military Hospital, whose headquarters are situated in Whitworth Street, Manchester, was opened for the reception of wounded soldiers upon September 20, 1914.

Since that date over 14,390 cases of sick, maimed, or disabled soldiers have passed through its portals from the Expeditionary Forces, many having received such serious injury from shot or shell as to permanently incapacitate them from ever following their occupations again.

Of these 14,390 and odd cases, the greater number have suffered from injuries necessitating their coming under the care of the general surgeon. A very fair sprinkling, however, having received serious damage to the pharynx, larynx, nose, or ear have been placed under the immediate charge of my colleague, Major Westmacott, and myself, either at Whitworth Street, the large military wards in the Manchester Royal Infirmary, or at one of our principal annexes in High Street, Oxford Street.

Our experience has been limited to the treatment of injuries to

¹ Paper read before the Laryngological Section of the Royal Society of Medicine, May 7, 1915.

the special organs we are here most interested in, the War Office having from the commencement very wisely determined to utilise the services of those in charge of the special departments at the Royal Infirmary for the work with which they were most familiar.

At the commencement of the war when our troops for strategical and other military reasons were retreating, it was noticeable that the larger percentage of those who were injured were wounded below the belt, as it were—the lower abdomen, the pelvis, the legs, and the feet.

Later on, when the army entrenched itself in the North of France and in Flanders, injuries to the head, neck, and upper part of the thorax became more frequent, the actual conditions of fighting explaining the difference in the situation of the wound or wounds received.

As might be expected, and as unfortunately proved only too true, in many instances the wounds received proved immediately fatal or fatal within a few hours or days.

Many of the injured whom we have seen have had miraculous escapes from death, the projectile or piece of shrapnel passing within a hair's-breadth, as it were, of some important structure which, if lacerated, would have meant practically instantaneous death.

What has struck us very forcibly has been the comparative immunity from septic complications of many of the injuries of the face and neck, and this we attribute, in part at any rate, to the absence of clothing in these particular regions and to the consequent non-contamination of the wound with portions of uniform, soiled underwear, earth, manure, etc., and also to the fact that in many cases the tracts of infection have communicated with the external air by way of the nasal passages, the mouth, the larynx, etc., a circumstance unfavourable to anaerobic infection of discharges from the wound.

In many of the cases seen by us the velocity of the projectile, fired at a comparatively short range, has been such as to pass clean through the head or the face, the wound of exit being hardly, if any, larger than the wound of entrance. The fact also that the bones of the face and of the framework of the nose are thinner and more brittle than those of the skull and extremities has probably had much to do with permitting the projectile to pass more cleanly through than is the case in, say, the long bones of the arms or legs, where splintering and severe comminution have been so frequent and have proved so disastrous.

PLATE II.

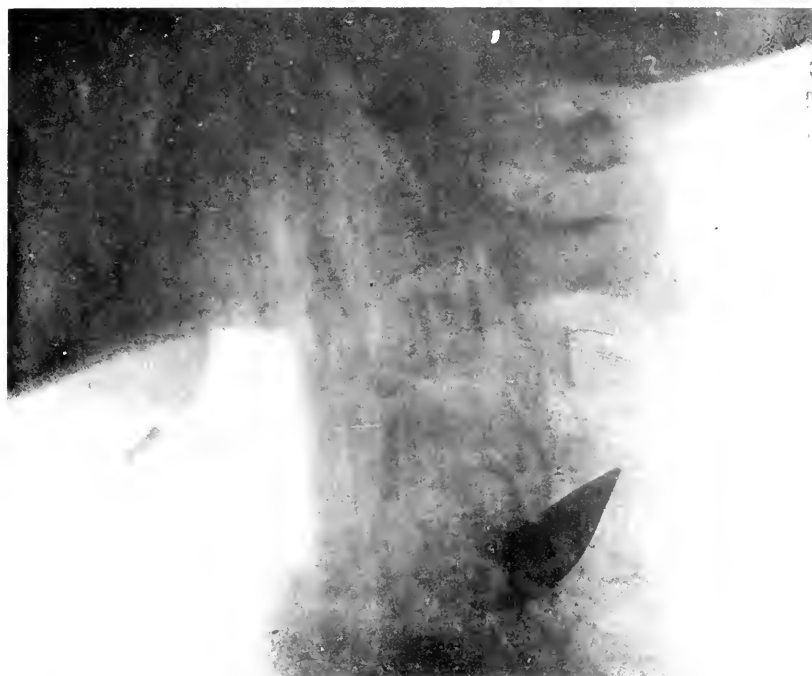


FIG. 3.—Broken rifle bullet on left side of fourth and fifth cervical vertebrae.



FIG. 4.—Foreign body in swelling $\frac{1}{2}$ in. deep to left of middle line; also tiny foreign body just in front of larger one.

TO ILLUSTRATE MAJOR SIR WILLIAM MILLIGAN AND MAJOR F. H. WESTMACOTT'S
PAPER ON WARFARE INJURIES AND NEUROSES.

PLATE III.

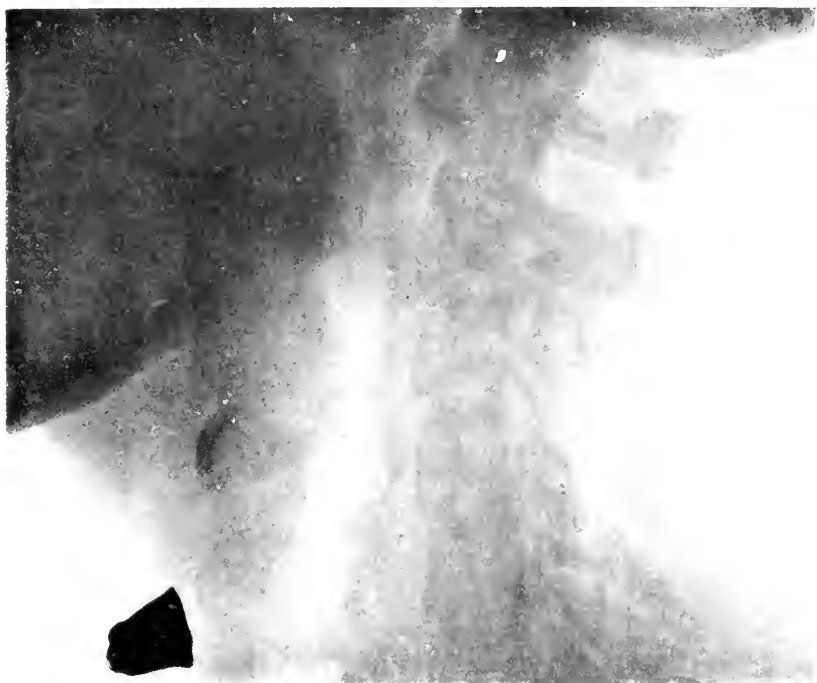


FIG. 5.—Foreign body in front of middle line of neck, level of fifth cervical vertebra.



FIG. 6.—Rifle bullet lying close to the left side of spine of second cervical vertebra. Nose of bullet missing.

TO ILLUSTRATE MAJOR SIR WILLIAM MILLIGAN AND MAJOR F. H. WESTMACOTT'S
PAPER ON WARFARE INJURIES AND NEUROSES.

Adapted from S. A. Imbr.

The problems, therefore, we have had to face have, from the surgical point of view, been considerably easier than have those pertaining to wounds of the extremities or internal organs where wound infection has been practically invariable.

The principle of securing and of maintaining free drainage and of utilising to the full the antibacterial properties of the individual's tissue fluids has been invariably acted upon.

Where a projectile or piece of shrapnel has become deeply embedded in the bony framework of the face, nose, or that portion of the vertebral column corresponding to the epipharynx, the pharynx, or the hypo-pharynx, when its position has been accurately located by radiography, and when there is neither troublesome hæmorrhage nor evidence of sepsis, our practice has been to leave it severely alone, repeated clinical and radio-scopic examinations being made to ascertain if it remains quiescent.

When, on the other hand, the projectile is quite superficial and accessible, and when its removal would not in any way interfere with the integrity of any important structure, our practice has been to remove it by the easiest possible route, with due observance of ordinary surgical principles.

We are satisfied, however, that in many cases the *noli me tangere* attitude is not only in the best interests of the patient, but is also the most scientific. All meddling surgery, more especially by those untrained and unaccustomed to surgical manipulations, is, in the interests of the wounded, to be highly deprecated. We are strongly in favour, in the surgical treatment of warfare injuries and wound infections, of standardising the methods of treatment, so as to avoid undue experimentation and the following out of individual and often insufficiently tried methods of treatment, the actual results of which the surgeon is often little aware of. At the 2nd Western General Hospital there has been a remarkable uniformity of treatment, alike conservative and scientific, with the result that amputations have been very few, and many a limb, which on admission looked most unpromising, has been saved to its rightful owner.

When severe laceration has taken place and tracts of highly infected tissue are present, the underlying principle in treatment has been to open up the wound in every direction, to irrigate with antiseptic lotions, especially hydrogen peroxide, and to encourage a free flow of lymph by lavage, baths, etc.

In injuries to the nose and naso-pharynx, the immediate anxiety has often been the arrest of hæmorrhage, and the remote one how

best by some form of plastic operation to restore function and appearance. In several of our cases, hæmorrhage has been severe, and it has not always been possible to ascertain its actual source. In but few cases, however, has it been necessary to do more than plug from the front.

In one case, where a bullet entered the side of the face just below the left malar bone and passed across the nasal passages, emerging just under the malar bone upon the opposite side, the turbinal mucosa was much lacerated. Several attacks of severe hæmorrhage having taken place prior to admission to hospital the nasal passages were carefully cleansed, a few fragments of necrosed bone removed, and large doses of emetin ordered with satisfactory results. In a few instances the bullet has been spat out after reaching the mouth, and in one case we removed a German bullet which was normal in size and shape, from between the layers of the soft palate.

In another case, that of a Belgian soldier, a bullet passed through the left nasal process of the superior maxilla and became embedded in the posterior antral wall upon the left side (Fig. 1). Two attacks of severe bleeding followed. Some necrosed bone was subsequently removed, after cutting through dense adhesions between the septum and inferior turbinal body, but the bullet was not interfered with and is there to this day, as may be seen by reference to the X-ray photograph in the adjoining room: he recovered completely.

In another case (Fig. 2) a piece of shrapnel passed through the left lacrymal sac and became embedded in the left inferior meatus, with the result that dense adhesions formed between the inferior turbinal and the septum nasi.

The piece of shrapnel was subsequently removed and the adhesions divided.

In comminuted injuries of the framework of the nose, the maintenance of a free passage and the prevention of adhesions has presented considerable difficulties. As an effective splint we have found nothing better than the finger of a disused rubber glove packed with gauze. It is light, unirritating, and capable of being made practically any size according to the amount of packing introduced into it.

When the bridge of the nose has been severely injured and depressed, with the result that its tip assumes the *en lorgnon* position, a most unsightly spectacle, some form of plastic operation is required. So far we have not been called upon to perform

any such operation, although two cases are shortly to be dealt with.

Severe injuries to the larynx have been comparatively rare. In one case a bullet struck the side of the neck at the level of the upper border of the thyroid cartilage upon the left side, was deflected by the cartilage, ran down the neck, and became embedded behind the left sterno-clavicular joint. Severe perichondritis of the arytaenoid cartilage resulted, accompanied by such an amount of œdema as to necessitate a tracheotomy. When last seen the patient was still wearing the tracheotomy tube, and the œdema was slowly subsiding. Figs. 3, 4, 5, show foreign bodies lying in the soft tissues in the immediate neighbourhood of the larynx.

Quite a number of cases of severe laryngeal catarrh from the trenches have been seen, but have presented no features demanding special attention.

Another class of injury quite different from the type of projectile injury we have been considering, but none the less interesting, is injury of motor or sensory nerve tracts coming under the heading of warfare neuroses.

We understand that neuroses of the organ of hearing are not included in our discussion to-day, and this we consider unfortunate, as warfare neuroses of the eighth nerve associated with such other neuroses as loss of smell, loss of speech, and even loss of memory have been by no means infrequent, and open up a field of inquiry, both pathological and physiological, at once interesting and instructive.

When there has been a definite objective injury to any one particular nerve or group of nerves preventing the passage of motor or sensory impulses to or from the central nervous system, the resulting lesion or lesions are readily explicable, but where there has been no local lesion, no outward mark of internal disturbance, the problems offered for our solution are extremely difficult.

As an example of injury with definite objective evidence, we may cite the case of a soldier suffering from left recurrent paralysis from a bullet wound in the face. In this case the bullet is embedded close to the spine of the second cervical vertebra (Fig. 6). In its passage it must have injured those fibres of the vagus which go to form the nervus recurrens at a distance of from one to two inches below the base of the skull.

Or the case of another soldier seriously injured by a bullet which passed from just below and behind the lobule of the left

ear, traversed the skull, and so completely disorganised the contents of the right orbit as to necessitate removal of the eye. In its passage it so damaged the cribriform area as to produce almost complete anosmia.

Nerve injuries such as those present no particular difficulties, but when one comes to cases of loss of sight, of speech, hearing, smell, or memory, without any objective evidence of damage done, we are at once faced by problems of real moment.

We speak constantly of concussion as the cause of such cases—but what is concussion? Is concussion always attended by definite organic changes, however minute, or are there certain molecular alterations in tissue fluids or tissue cells which so modify the transit of impulses from the higher nerve centres as to produce at times temporary, at times permanent, loss of function?

Again, in certain of these cases is there an element of hysteria, or is it a subconscious manifestation of the effects of sheer fright? What has struck us very forcibly has been the rapidity with which many of these cases recover when the patient is nursed under favourable and quiet surroundings, "far from the madding crowd's ignoble strife."

If we may be allowed to revert for one moment to the auditory nerve, we are satisfied that so-called concussion deafness is, in many cases, merely a passing phase in the temporary abolition of sensory impulses in a brain already anemic as the result of physical fatigue and mental strain, the actual loss of hearing being induced by a sudden climax as it were, *i.g.* the bursting of a shell, accompanied as it is by a general atmospheric commotion, and the not infrequent burial of the soldier in the earthwork of his trench. Nine or ten cases have been observed by us, of the deaf and dumb state, all recovered from within six weeks.

The period of subconscious inertia following such injuries varies within wide limits, as also does the response of the special organ or organs involved. That the abrogation of function is due not to an organic lesion, but to a temporary suspension of neuron impulses from the higher cortical cells of the central nervous system to the periphery is our belief.

Our view is that the hiatus or synapse interfering with the flow of nervous stimuli is a central and not a peripheral one, for the reason that in so many of the cases of sudden blindness and sudden deafness no trace of any peripheral organic lesion was demonstrable, and moreover the rapid recovery of so many of the patients we have observed is a strong argument that none was ever present.

What has struck us in many of the cases of so-called concussion deafness has been the presence of previous ear disease. This we believe has tended to throw the effects of the concussion more upon the sentient than upon the conducting segments of the organs of hearing. Illuminating evidence of the central origin of these functional disturbances is also obtained from an examination of soldiers who have suddenly lost the power of speech.

Laryngeal examination demonstrates that these cases are not cases of hysterical aphonia, but that they are cases of neurotic or functional aphonia due to the sudden arrest of those volitional impulses which are necessary to produce speech. There is no paresis of the adductors as in true hysterical aphonia; there is a total inability to put the vocal cords in motion. Something has happened to prevent volitional impulses, a synapse somewhere, and probably in the cortical cells of the centres for speech, precluding that transmission of nerve energy which is requisite to set the machinery of speech in motion.

Such cases do well with rest, strychnine, and a judicious mixture of auto-suggestion and encouragement.

These thoughts and observations, Mr. President, are but as pebbles on a rock-bound coast, a coast presenting difficulties to him who would explore inland, but the man who succeeds in passing what at first sight appear impenetrable barriers will obtain the reward of having added something to the sum total of human knowledge, of having done something for the benefit of mankind in general, and in particular for the welfare of those courageous men who at present so bravely and tenaciously defend our sea-girt home.

"On Fame's eternal camping ground
Their silent tents are spread,
And Glory guards with solemn arms
The bivouac of the dead."

ABNORMALLY LONG STYLOID PROCESS CAUSING THROAT SYMPTOMS; REMOVAL.

By W. S. SYME, M.D., F.R.S.E.,

Assistant Surgeon, Glasgow Ear, Nose, and Throat Hospital, etc.

THIS condition has been so infrequently described that the report of a case may not be lacking in interest.

The patient was a medical man, aged forty-three, rather stout, and with a short thick neck. Three years ago he had a severe

tonsillitis. He had since suffered from a sensation of dragging in the left side of his throat, worse on swallowing. Some shooting pain was experienced in the left ear, in which also he was slightly deaf at times. As first he was inclined to associate these sensations with the previous tonsillitis, but as the discomfort increased he examined his throat carefully, at first by sight and then with his finger, when he discovered a firm substance about the middle of the left tonsil. On examination with the mirror the throat appeared normal. With the finger a hard nodule was felt about the middle of the tonsil. It gave the impression of being situated in the tonsil and movable with it. A cartilaginous nodule suggested itself, though the dragging sensation on swallowing, the pain shooting into the ear, and a feeling of resistance rather than of actual swelling on that side of the neck externally, made one keep in mind the possibility of it being a long styloid process. The tonsil was enucleated with the snare under local anæsthesia. Firm resistance was encountered on tightening the snare. After removal of the tonsil on examining with the finger a sharp point of bone was felt piercing the sheath of the constrictor. The muscle was pressed outwards as far as possible and a portion of the styloid process an inch in length was broken off with forceps. The after-history was that of an enucleation, and the symptoms previously complained of disappeared.

Probably in these cases, and certainly if one could be sure of the diagnosis without removal of the tonsil, it would be better surgery, as being aseptic, to remove the styloid process through an external incision.

The moral of the case is that one should examine with the finger when there is nothing to *see* to account for the symptoms complained of.

OTOLARYNGOLOGICAL CASES FROM A MILITARY HOSPITAL.

By ARCHER RYLAND, F.R.C.S.E., LIEUT., R.A.M.C.

Pan-sinusitis of long standing treated by Radical Operation on Affected Sinuses—Recovery, and return to duty in ten weeks.

—Pte. F—, aged twenty-two.

March 16th.—Patient complained of nasal obstruction chiefly

on the left side, a foul discharge from both sides of the nose, and impairment of the sense of smell. The history was one of at least twelve months and probably more.

All ordinary signs of long-standing sinus sepsis were present. There was a slight deviation of the septum to the left, and on the right of septum a large basal spur. A mass of polypi filled the left nasal fossa.

The polypi were removed. A day or two later exploratory puncture of the left antrum revealed the presence of several drachms of stinking pus.

The left middle turbinate and overlying mucosa were so far necrosed that approach to the frontal sinus on that side was unusually free. On lavage of the frontal sinus, a quantity of thick offensive pus was removed.

On investigation of the sphenoid sinus, the ostium was identified surrounded by diseased and polypoid mucosa. There was no evidence that its cavity actually contained pus.

The following operations were performed, and in the order stated:

(1) Caldwell-Luc on left maxillary antrum. (Previous to the procedure the antrum had undergone a daily lavage for three weeks, with purulent return on each occasion.)

(2) Ethmoid and fronto-ethmoid curettage; local anæsthesia (repeated after an interval of a few days).

(3) Luc's operation on left frontal sinus. Sinus was large. The mass of thickened polypoid mucosa, smooth and bulging on its outer surface when first exposed, was removed *en masse*, together with its extension into the fronto-nasal duct, leaving the osseous walls perfectly clean. The distance from the roof of frontal sinus to the anterior nares 8.4 cms.

(4) Exposure of sphenoid ostium; local anæsthesia. Removal of neighbouring diseased mucosa. Enlargement of ostium by removal of bone laterally and inferiorly around its margins. (Posterior wall of sinus measured 7.6 cms. from the anterior nares.)

The above operative treatment, together with non-operative treatment, extended over a period of ten weeks. At the end of that time all accessory sinuses were free from disease.

Chronic Suppurative Otitis Media. Acute Mastoiditis and Labyrinthitis.—Pte. F. W—, aged twenty-four. The patient had a chronic middle-ear suppuration on the left side. An acute mastoiditis supervened, followed in a few days by signs of acute labyrinth involvement.

When first seen the patient complained of mastoid pain, ear discharge, headache, giddiness, vomiting, and staggering gait.

On examination, there was a spontaneous horizontal nystagmus to the right, well marked. With regard to left ear, there was a copious discharge, flakes of cholesteatoma in attic region, mastoid tenderness over antral region and also over tip of process. The fistula test was negative, and the caloric test gave a normal response. Operation was determined by increase of general mastoid tenderness, increase of vertigo, and persistence of nystagmus and vomiting.

Radical mastoid.—Flakes of cholesteatoma were found in the aditus and attic. Exposure over a small area of a normal lateral sinus wall. There was considerable disease in the neighborhood of the external semicircular canal, which showed on the most prominent part of its convexity a very obvious erosion. On examination with probe it was found that no fistula was present. No operative measure was taken with regard to the labyrinth.

Following the operation the vertigo and vomiting rapidly got better, and both had ceased in forty-eight hours. The nystagmus lasted for twenty-one days. It gradually assumed a horizontorotary character and eventually disappeared three weeks after the radical operation.

The healing of the mastoid cavity and wound followed a normal course.

Severe Self-inflicted Wound of Larynx; Primary Suture; Tracheotomy; Recovery.—H. R.—, aged twenty-three. On examination of this case shortly after infliction of the wound, it was found that the cavity of larynx had been extensively opened by a deep horizontal incision across the front of the neck at a level through the thyro-hyoid membrane, just above the upper borders of the thyroid alæ. The sterno-mastoid muscle on neither side was involved. There was a complete severance of the thyro-hyoid membrane. The thyroid and cricoid cartilages were widely separated from each other, and the posterior wall of the pharynx, uninjured, was freely exposed to direct inspection.

Operation: The hyoid bone and the thyroid cartilage were approximated by means of deep catgut sutures encircling the hyoid bone above and piercing the upper part of the thyroid alæ below. The upper and lower halves of the thyro-hyoid membrane had retracted to such an extent that it was found impracticable to secure their free edges and unite them.

Tracheotomy was performed, and the original wound in the skin and superficial tissues was closed in the usual manner.

Recovery without pulmonary complication, hæmorrhage, or interference with laryngeal movements.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

March 5, 1915.

Dr. JOBSON HORNE, *Vice-President, in the Chair*

Angeioma (Bleeding Polypus) of Nasal Septum.—**William Hill.**—Female, aged twenty-five. A vascular growth, which has bled on several occasions, is seen springing from the anterior end of the right vestibular surface of the nasal septum. It has been noticed for six weeks, and is increasing. Eradication by surgical diathermy was proposed.

The CHAIRMAN regretted that their President, Dr. William Hill, had been unavoidably prevented from presiding. The nature and treatment of "bleeding polypus" of the septum of the nose was familiar to them all. The situation of the growth, in Dr. Hill's case, on the most anterior part of the vestibular surface of the nasal septum was perhaps a little unusual. The case reminded him of one which he had brought before the Laryngological Society of London many years ago.¹

Dr. PEGLER agreed with the President's diagnosis; as sometimes happened with these angeiomas, the growth started from the septal wall of the vestibule close to the junction of skin and mucous membrane. He hoped that Dr. Hill would preserve the specimen by removing it entire in the usual manner.

Report upon Dr. Hill's Specimen of Septal Angeioma.—The growth, somewhat mushroom-like in shape, cut vertically, belongs to the close-textured, soft-cell type of *fibro-angeioma*. The convex surface is overlaid by fibrinous plasma containing leucocytes. Around the base is stratified epithelium sending in many prolongations of prickly cells. Thick fibrous trabeculae ramify into the body of the growth from the pedicle, and merge in the dense meshwork of connective tissue sustaining endothelioid cells and enclosing abundance of blood sinuses, mostly very small. Lymphocytes have freely infiltrated an extensive area towards the periphery.

L. H. PEGLER.

Left Recurrent Paralysis associated with Mitral Stenosis.²—**L. H. Pegler.**—The patient (deceased) was a Jewish girl, aged nineteen, who came to the Metropolitan Throat Hospital in July, 1914, complaining of hoarseness on awakening and vocal disability which had dated from the previous January. This was found laryngoscopically to be due to

¹ *Vide Proc. Laryng. Soc. Lond.*, 1896, iv, pp. 31, 32.

² See also p. 328, of this issue.

paralysis of the left vocal cord, which was fixed. Dr. T. D. Lister, at Mount Vernon Hospital, had noted some dilatation of the heart, with presystolic and systolic murmurs. She was admitted at the Brompton Chest Hospital on August 11, under Dr. Bosanquet, who has kindly lent the photographs shown, and supplied the following notes taken during her stay, which terminated at the friends' desire on October 26. She died at home four days after her discharge, her local doctor reporting that she gradually sank. On admission to Brompton Hospital the girl, who had suffered formerly from rheumatic fever, complained of cough, pain in left breast, and shortness of breath. A long presystolic murmur was audible at the apex, with thrill. Posteriorly, some râles at the bases of both lungs. The temperature remained at about 100° F. all the time; there were no tubercle bacilli in the scanty sputum. It was thought that some latent infection might be present as suggested by the fever. Dr. Dundas Grant examined her by direct bronchoscopy, and found no abnormal pulsation. Dr. S. Melville X-rayed the thorax on August 17, and reported: "Heart enlarged, purse-shaped. Above the left border is a well-defined shadow more or less in situation of right ventricle. Aorta wider than normal." In the absence of an autopsy, the intimate relationship between the cardiac conditions and the recurrent paralysis must remain a matter for speculation. Sir StClair Thomson in his book quotes Ortnier¹ as the first to describe this rare complication of mitral disease, and states that thirty-seven more have been published since, but the instances are few in which the causal relationship has been established *post mortem*.

Dr. PEGLER wished to add that Dr. Stanley Melville, who X-rayed the thorax, now held the view that there was a mediastinal neoplasm. There was a number of blotches at the root of the lung in the skiagram, and these had suggested that diagnosis. Mr. E. D. Davis had just told him of a case he had treated in Charing Cross Hospital which had ended fatally, and in which mediastinitis had been found *post mortem*; enlarged mediastinal glands were present, and Mr. Davis had formed the opinion that the recurrent nerve had been stretched by these bodies, and not by the dilated aorta. There was a good deal of recent literature upon the subject, and according to some authors it had been very difficult to clear up the actual relationship between the heart affection and the paralysis in several of the cases, even after a *post-mortem* examination had been made.

Dr. DE HAVILLAND HALL said that in the discussion of some months previously he brought forward a similar case, and he had known several other cases in which mitral stenosis was associated with left recurrent paralysis. Unfortunately it was not possible to verify the result in his own case, as in other cases, by necropsy. So far as X-ray examination went, his own case was undoubtedly due to pressure upon the left recurrent, owing to the dilated condition of the heart.

Sir STCLAIR THOMSON said that his experience of this condition was only second hand, but he had read up the literature of the subject. There were few if any cases in which the *post mortem* had proved that the enlarged left auricle was the cause of the paralysis. It would be a very good subject for exact investigation by young laryngologists with material. Killian had written, since his (the speaker's) book was published, to the effect that in his opinion it was anatomically impossible for the left auricle to produce any pressure on the recurrent laryngeal.

Dr. DUNDAS GRANT had seen this case at Brompton Hospital, and

¹ *Wien. klin. Woch.*, 1897, x, p. 753.

had sought to determine whether there was any evidence of pressure on the œsophagus and on the air-passages, on the part of the left auricle, as revealed by œsophagoscopy. No abnormal pulsation was to be made out in the œsophagus; certainly there was no pressure there. The bronchioscopic examination was rather indecisive. In any case, the question of a direct pressure on the laryngeal nerve by the left auricle seemed to be very uncertain. They knew, from the relation of the left auricle to the aorta, that there was between the two the pulmonary artery—a very large structure, which would act as a sort of cushion separating them. The probability was that there had been some coincidental neuritis, perhaps associated with pericarditis, which was almost always present in extensive dilatations of the cavities of the heart. There was on record a case in which hoarseness disappeared after two days on digitalis, but in this particular instance, in spite of treatment in bed and the administration of digitalis, there was no disappearance of the paralysis of the left vocal cord. The question as a whole seemed to be undecided, and he only regretted that in this particular instance they did not have an opportunity of clearing up the case, as Dr. Pegler would have wished, by means of an autopsy.

Mr. STUART-LOW recalled the case of a girl, aged nineteen, who had been very thoroughly examined by Dr. Hawthorne, and who reported on the condition of the heart. In this case the auricle was very large indeed, and he considered that pressure was direct on the recurrent nerve. In this particular instance, a long rest in bed had been effective, and movement of the vocal cord had partially returned under this treatment.

Superior Maxillæ, exhibiting Abnormal Conditions of the Nasal Fossæ and Maxillary Antra—L. H. Pegler.—The exhibitor is indebted to Dr. Macphail, of St. Bartholomew's Hospital Medical School, for showing him, and permitting him to bring forward No. i, and, similarly, to Prof. Symington, of Queen's University, Belfast, for Nos. ii, iii, and iv. They are anatomy room specimens, and therefore without histories.

(i) *A Left Side Superior Maxilla, from an aged Female Subject.*—[This specimen was shown at the December meeting.] There is a linear congenital deficiency in the outer wall of the inferior meatus, running nearly the whole length of the floor, and on a level with it. This morphological change is rare, and, according to Prof. Keith, its correct interpretation is to be found in conjunction with a study of the upper jaw of a catarrhine monkey of the baboon class (a bisected skull of a baboon, and also of a chimpanzee, lent by the Royal College of Surgeons' Museum, and an illustrated paper by Prof. Keith upon it, were shown¹). The abnormality should be considered as a distension outwards of the inferior meatus, that has done duty for, though not homologous with, the maxillary antrum in this subject. In this light the true antrum in this subject is represented by a small chamber in the malar apex of the cavity, cut off from it by a bony partition, and communicating through a normally placed ostium with the middle meatus: this is the normal location of the maxillary antrum in the baboon. It is somewhat puzzling to understand what has been gained from a physiological standpoint by the closing in of this well-placed drain aperture in the outer nasal wall, a change which in the ascent through the anthropoid apes—gorilla and chimpanzee—to man, has gradually evolved. The middle turbinate in this specimen is enormously hypertrophied and cystic.

¹ *Journ. of Anat. and Phys.*, 1902, ii, pp. 47-50.

(ii) *The Superior Maxillæ with Nasal Septum (detached) of a Subject showing Membranous Adhesion of the Inferior Turbinates to the Nasal Floor.*—On both sides rather more than half the central part of the lower border of the inferior turbinate is fused with the mucous lining of the inferior meatus, establishing a supplementary channel. In consequence of the outer and anterior direction of the adventitious wall, the front aperture of this channel is contracted and much lateralised externally, but the posterior end is larger and points directly backwards. For purposes of demonstration, the left maxilla has been divided coronally into three parts, and shows the relation of the synechia, which Dr. Malcolm, of Belfast, in a well-illustrated paper on this specimen,¹ states to be 4 mm. thick, and made up of mucous and submucous tissue; this structure might not impossibly be inflammatory, but the close similarity of the two sides does not favour this view.

(iii) *The Superior Maxillæ with portions of adjoining Bones, from a Male Subject, aged sixty-two.*—The two specimens which are remarkably similar, show free communication between nasal fossa and antrum. This is effected through a round opening, about the diameter of a sixpenny-piece, with membranous margin, in the centre of a large shallow depression involving almost the whole of the outer nasal wall, and incorporating the normal ostium. Fibrous string-like bands of tissue slightly contract the right opening, and on the left side the vestige of middle turbinate that remains is adherent to the wall by radiating bands of a similar nature. A remnant of the anterior extremity of the inferior turbinate is seen in the left fossa. There are good evidences that the destruction has been wrought by syphilis.

(iv) *The Lower Part of the Head and Face, with Roof of Mouth and Soft Palate of a Male, aged twenty-one.*—Separation has been made from the upper part through a line carried below the orbits in a plane parallel with the central horizontal axis of the septum nasi, and met by a coronal cut through the nasopharynx. Professor Symington states that the man had slight mental weakness. The palate is arched and shows a congenital median aperture, part of a fissure which in the soft palate has been closed by sutures. The cicatricial tissue suggests the existing displacement of the upper lateral incisors behind the central, following operation; the bicuspidis are also slightly out of place. The nasal cavities are ill-developed and extremely narrow in the plane of section, which exposes a right-sided angular deflection of the septum. The posterior part of the middle and inferior turbinates are bulbous and hypertrophied, encroaching much upon the space, and recalling familiar abnormalities of lymphoid and mucous structures in this region, in cleft palate subjects.

Mr. HERBERT TILLEY said the only clinical condition which somewhat resembled Dr. Pegler's first specimen occurred in a patient in whom a chronic left-sided antral empyema failed to be cured after the radical operation through the canine fossa. A second operation led to the discovery of a cavity occupying the malar recess, which communicated with the main antral cavity by a very small opening. When this recess was freely drained the suppuration ceased.

Dr. PEGLER said that the baboon-like antrum was destined for the museum of the Royal College of Surgeons, and would always be available there for inspection, as would also the illustrations in the Anatomical Society's Journal.

¹ Read before the Ulster Medical Society, April, 1914.

Synechiæ and Contraction of the Vestibules.—**L. H. Pegler.**—Private H. H.—, aged twenty-five, Grenadier Guards, was wounded in the nose whilst entrenched at Ypres, by the bursting of a shell. The condition when he came to hospital, was mainly one of stenosis of both nostrils, the end of the nose having been stitched up after being nearly severed, and a higher wound on the lateral aspect healed, whilst in France. The vestibules are almost closed by adhesions, and the columella thickened and shortened by inflammatory deposits. The same influence had affected the turbinals, which had probably been previously hypertrophied, so that the fossæ were also much stenosed and nasal breathing prevented. According to the soldier's account, his speech was altered by the accident, and so remains, excepting that much of his nasal resonance has been restored.

Treatment consisted in paring away cartilage and sawing off bony projections from the septum by the older methods, aided by the spoke-shave and punch, submucous resection being impracticable. Thus a way was cleared for reducing the right middle and left inferior turbinate in the usual manner, and for an indiarubber tube of about $\frac{3}{8}$ in. calibre being inserted in each nostril. These were worn continuously for a month, but on removing them the vestibular contraction from re-growth of tissue threatened to recur. It was not until two lesser operations had been performed, and the tubes had been worn for a few more weeks, that a good permanent airway became established. One would have liked to improve the external appearance of the nose, but the scars are becoming less and less conspicuous, and the patient is returning to duty breathing quite satisfactorily.

Tuberculous Inferior Turbinate.—**Cecil Graham.**—**Mr. CECIL GRAHAM** showed a photomicrograph of the tubercle bacilli in one of the sections, and said that he took the material away from the nose a few days after he showed the case at the last meeting of the Section¹; **Dr. Kettle** then injected the material into guinea-pigs. The injection was made three weeks ago, and up to the present the guinea-pigs seemed to be perfectly healthy. The Section would have the result of the test before them at the next meeting.

Pathological Report upon the Case of Tuberculous Inferior Turbinate shown at the last Meeting by Mr. Cecil Graham; by E. H. Kettle, M.D.—"Sections show active tuberculosis. Numerous small foci are present, consisting of proliferating endothelial cells with occasional giant cells. In places there is some necrosis. A few bacilli are present, which in shape and staining reaction resemble tubercle bacilli."

The **CHAIRMAN** said, in view of the fact that at times acid-fast bacilli resembling tubercle bacilli, but of a non-pathogenic nature, were found in nasal secretions, a diagnosis of tuberculosis might be vitiated by depending solely upon the microscopic evidence. He was therefore glad to learn from **Mr. Graham** that in this case animal experiment had been resorted to. The result of the inoculation of the guinea-pigs must be awaited before the point whether it was or was not a case of primary tuberculosis of the nose could be definitely established.

Bullet Wound through Face; both Antra and Septum perforated; Operation.—**G. Seccombe Hett.**—**Corporal M.—**. Bullet wound of head on December 1, 1914. First field dressing applied at

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., July, 1915, p. 288.

once. Injection of anti-tetanic serum. At the time the patient was rendered unconscious; both eyes swollen up; teeth loose. Arrived in England complaining of headache, discharge from nose, and left-sided deafness, stiffness of jaw, and inability to open his mouth.

On admission to hospital on December 10 there was an entrance wound over the left malar bone $1\frac{1}{2}$ in. anterior to auditory meatus, and an exit wound through the right cheek. The left lower eyelid was œdematous. The nose was full of crusts and pus, and there were adhesions between the anterior ends of both inferior turbinals and the septum, which were separated by Mr. Herbert Tilley. On December 15 a sequestrum was removed from the left nasal cavity, probably from the inner antral wall. A skiagram showed a number of tiny metallic filaments (probably of nickel casing) along the track of the bullet. On transillumination and X rays both antra were dark, but this was more marked on the left side. The photographs further showed fractures of the left malar, of the first upper molar on the left side, and of the first upper bicuspid on the right. On January 14, under anæsthesia, the nose was explored, a perforation found involving the vomer, and sequestra were removed. The left antrum was opened anteriorly and found to be full of pus, granulations, and splinters of bone. The Caldwell-Luc operation was completed and portions of both inferior turbinals removed. Splinters of bone were also found in the exit wound. The jaw was opened by means of a gag gently applied. Local treatment to the nose has been subsequently employed for the crust formation. The bullet, after passing through the face, embedded itself in the clay at the back of the trench, from which it was extricated by patient's brother. The core had evidently separated after the bullet's exit, from the nature of the wound, and only the casing was found. This casing is shown, and it will be noted that the point is only slightly blunted. The range is said to have been only 70 yards, and the patient is sure that the bullet came through a sandbag.

Mr. SECCOMBE HETT said that this case was of great military interest. It was an extraordinarily neat wound, made at a 70 yards' distance, and one felt that the bullet must have gone through with its core intact. Five openings had been made through the bone, each opening being of a size only just large enough for a bullet to pass through. The malar bone was fractured. Mr. Hett described by means of a skiagram the track of the bullet, which, he said, was so perfectly straight that a probe could be passed from entrance to exit. The patient had a good airway through the nose.

Bone impacted in Left Bronchus for Six Months; Removal; Recovery (Bone shown).—Sir William Milligan.—History as given by patient: "On July 29, 1914, whilst at luncheon I felt a piece of bone slip into my throat. It appeared to go into the windpipe, and caused great difficulty in breathing, with gasping, coughing, and sickness. Relief in about a quarter of an hour, but had frequent attacks of coughing during the afternoon. Went to Scotland on August 1. During the month of August the cough continued intermittently, and was always worse at night. On one occasion, after cycling uphill, I had a severe attack of breathlessness and wheezing, and was quite unable to speak. Towards the end of the year I got very quickly out of breath, and on one occasion, after running to catch a car, breathed with great difficulty and in gasps. On January 19, 1915, I had a very violent attack of breathlessness after running upstairs, followed by cough, expectoration of blood, and pain in the back, shooting from the back of the chest to the front.

I had to sit up for hours at night to stop the cough, and for the last three nights before the operation could neither lay upon my back nor right side on account of severe pain accompanying every attack of coughing."

X-ray examination upon January 21 (Dr. A. E. Barclay): "Slight thickening at root of left lung; no evidence of any bone." Examined by Professor George Murray, January 23: "Breath sounds near left bronchus similar to the sounds produced by a large goitre pressing on trachea; no pulmonary disease." Admitted to surgical home on January 27. Examination and removal of bone (per oral bronchoscopy) the following day. Complete recovery.

Subglottic (? Tracheal) Growth; Removal; Recovery.—Sir William Milligan.—Patient, male, aged sixty-six. Suffered from slight respiratory obstruction and intermittent attacks of aphonia from four to five years. No pain or expectoration. Respiration gradually becoming more difficult. Pedunculated growth seen arising from middle line of anterior tracheal wall; attachment about $\frac{1}{4}$ in. below vocal cords. Both cords normal. Growth occasionally seen to swing up between vocal cords.

Removal by the direct method. Application of liq. ferri perchlor. fort.

The CHAIRMAN said that he had one remark ament the case to make on behalf of their President, who, although not able to be with them that afternoon, had nevertheless studied the notes of the cases brought forward. Dr. Hill raised the question whether the situation of the growth justified its being described as tracheal. The note stated that the growth was attached a quarter of an inch below the vocal cords. It would be better, in Dr. Hill's opinion, to describe it as a laryngeal and not as a tracheal growth. With that opinion he (the Chairman) fully concurred. In the literature, tracheal growths were comparatively rare, but the more common laryngeal growths were not infrequently subglottic in their attachments.

Sir FELIX SEMON asked what was the nature of the growth.

Dr. KELSON asked whether the growth was connected with the thyroid gland. Some three years ago he showed before the Laryngological Section a case in which the growth consisted of thyroid tissue.¹ It was well known that growths in that region were sometimes of this nature, and they were of interest developmentally.

Dr. DAN MCKENZIE said that subglottic growths were not uncommon, but pure tracheal growths were rare. Some two or three only had been published in the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY within the last few years.² The question was whether this was purely a tracheal growth.

Dr. DUNDAS GRANT asked what were the dimensions of the growth.

Sir WILLIAM MILLIGAN said that with regard to the question of calling the case a growth in the trachea, there was certainly something in the criticism which had been made from the Chair. He had thought of calling it a sub-glottic growth, but the attachment was fairly large. Whether the growth absolutely originated in the trachea, or was just above the origin of the trachea, it is extremely difficult to say. But he was quite willing to alter the title and call it a subglottic growth, although he thought part of the pedicle was attached to the mucosa of the trachea. With regard to the nature of the growth, he did not think it contained thyroid tissue; according to microscopic examination it was a local

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxvii, p. 322.

² *Ibid.*, 1912, vol. xxvii, pp. 123, 322; 1913, xxviii, pp. 376, 509, 596.

lymphangiectasis with a fibrous capsule. As to its dimensions, it was just under $\frac{1}{2}$ in. in diameter.

Dentigerous Cyst of the Lower Jaw; Operation.—**Sir William Milligan.**—Boy, aged fifteen. Indefinite history of pain upon right side of face. Six months previously progressive swelling of right side of face; more marked recently. Slight pain, especially at night. Examination with finger in mouth causes pain and a definite papyraceous sensation.

X-ray Report.—"It is one of the most perfect cases of dentigerous cyst I have ever seen. It is very extensive, and in the lower part is a molar tooth. The bone is expanded to a thin shell, but there is no indication that the condition is anything other than an uncomplicated dentigerous cyst."—A. E. BARCLAY.

Opening of cyst and removal of lining membrane (section shown) and tooth.

[*Note.*—This case produced an interesting discussion on the treatment of dentigerous cysts of the upper jaw.]

Mr. HERBERT TILLEY said that cysts in the upper jaw as large as the one described could not be cured by simply scraping them out, because the granulation tissue nearly always suppurated, and this entailed a very long convalescence. In such cases he had always adopted the method of breaking into the antrum, removing the cyst wall, making a large communication into the nasal cavity, and sewing up the buccal wound at the time of the operation. If one opened these large cysts and packed the bony recess daily, in the hope that the cavity was going to granulate, the after-treatment would be a prolonged business.

Sir STCLAIR THOMSON supported Mr. Tilley's views. The treatment of cysts of this type in the upper jaw was most unsatisfactory. Two of his cases never got well. There were cases in the clinic for months and years, in which there was a continual history of stopping, and scraping, and waiting for this granulation which never filled it up. Therefore he had adopted the plan of trying to make them communicate either through the antrum, or directly, into the nose, and even then he had not been able to cure the suppuration.

Dr. DAN MCKENZIE said that he had been very much interested in hearing these remarks because in a recent case which he saw there was an enormous cyst which occupied the greater part of the antral cavity. In the course of the operation he accidentally broke through the small casing of shell-like bone, and having done that he obliterated it and made communications in the way that had just been suggested. The suppuration ceased promptly, and the patient got quite well except that, from the distension of the antrum and the superior maxilla, it was impossible to keep closed the opening between the mouth and the antrum. The dentist had now made a plate which closed the opening. The speaker had tried to do a plastic operation, but the stitches broke down, the traction being too great.

Mr. H. L. WHALE asked how this growth had been approached—through the alveolus or the antrum wall?

Mr. TILLEY, replying to Mr. Whale, said that it was his practice to make an incision into the mucous membrane, over the most prominent portion of the cyst, to reflect this carefully, and then remove all the cyst wall, before reuniting the lips of the original incision of the buccal mucous membrane.

Sir WILLIAM MILLIGAN said that the operation took place two or three weeks ago, and absolutely the whole of the cyst wall was taken out;

so far the case was going on satisfactorily. There was already contraction to the extent of at least two thirds of the original size. He certainly looked forward to a good recovery. Had the cyst been in any way connected with the upper jaw or antrum, his treatment would have been different.

Perithelioma of Maxillary Antrum.—**H. L. Whale.**—Female, aged fifty-two, has had an increasing lump under the right eye for four years. She came to hospital in September, 1914. The swelling was then limited to the antrum, bulging chiefly outwards and inwards, hardly at all towards the orbit and not at all downwards. Puncture revealed a solid tumour. Chloroform being administered, the antrum was approached from under the cheek: the intention was merely to remove a piece for examination, but a large mass of growth was shelled out, and finally the appearance was almost normal. However, the exhibitor felt sure that some growth remained at the upper margin. The mass now seen at and below the inner canthus has grown since then: but exhibitor, immediately after the former operation, went to France and lost sight of the patient.

Histological Report by Pathologist.—A somewhat friable tumour, studded throughout with many small spicules of bone. In section: in parts the tumour presents irregularly circular areas, richly cellular, separated from one another by delicate fibrous tissue in which particles of bony structure are found. These cellular areas present internally a roughly circular space filled with red blood-corpuscles. Bounding the space externally is a layer of flattened cells, suggesting the internal lining epithelium of a vessel. External to this are many closely packed, small, ovoid cells, with a well-defined nucleus, arranged in a concentric manner around the lumen. In other parts of the section, irregular columns of similar cells are seen infiltrating the fibrous tissue. These appearances suggest a perithelioma originating in the small blood-vessels.

Mr. HERBERT TILLEY suggested making a small incision in the growth and burying a strong radium tube within it.

Dr. WYLIE thought it would be difficult to treat this growth by any surgical measures, and he suggested that the exhibitor should treat his patient by exposing her to erysipelas. He had a case of epithelioma, in which the disease was extensive, and the patient was considered hopeless. Erysipelas broke out in the ward, and the patient contracted it and was very ill for several weeks. On recovery the epithelioma was cured, and there had been no recurrence. The treatment was drastic and dangerous, but the disease was dangerous, too. Dr. Wylie was so struck with the result that he had been trying Coley's fluid once more in such cases.

Dr. DUNDAS GRANT said that a material point in this connection was as to whether the tumour in Dr. Wylie's case was identical in nature with the one under discussion in Mr. Whale's. The one, he thought, was an endothelioma and the other an epithelioma.

Mr. STUART-LOW said that he had had a similar case which had apparently got well, but after an attack of erysipelas the malignant disease returned in six months' time in an aggravated form, and the patient died.

Mr. W. D. HARMER said that the difficulty in these cases was to know exactly the nature of the growth, whether it was sarcoma or endothelioma. The latter type of growth would sometimes disappear in three weeks after a large dose of buried radium, but it was not yet known whether per-

manent cures could be obtained by this means. He believed that the earliest case of endothelioma reported as cured by radium only dated back three or four years, and that in some of these cases it would be found that the cure was only a temporary one.

Sir WILLIAM MILLIGAN urged that if radium was to be used it should be used in massive doses and with needles—at least a dozen needles—so as to get the benefit of very intense cross-firing.

Mr. WHALE said that he was very much obliged for the suggestions. He did not, however, feel that he would like to give the patient erysipelas. He had been thinking of trying diathermy, and two members on seeing the case had strongly recommended surgical operation. The case differed in nature from Dr. Wylie's, which was, he understood, an epithelioma.

Dr. DAN MCKENZIE said that on seeing the case he had urged that it be dealt with surgically, and he still maintained that opinion. He would certainly be inclined to attack that growth by a Moure's incision and free exposure, and thought it could be treated successfully.

Patient from whom the Piece of Tin was removed by Posterior Œsophagotomy.¹—H. L. WHALE.—The scar is linear and so far back as to be invisible when the patient is clothed and wears a high collar. This is one advantage of approaching the œsophagus from behind the sternomastoid.

Œsophageal Stricture in Children.—C. W. M. HOPE.—*Case 1.*—Male, aged seven and a half, was admitted to hospital with the history of having vomited at least once a day since about the age of two months. An X-ray photograph shows a well-defined stricture of the œsophagus behind the pericardium. At Dr. Frew's request I examined the child with the œsophagoscope on February 17, 1915, and found enormous dilatation of the upper œsophagus. The dilated portion contained much undigested food; the lining membrane above the stricture was very unhealthy, in parts denuded of epithelium, and bled easily on swabbing, and towards the right side were seen some very definite areas of scar tissue. The mouth of the stricture was well defined, and admitted with difficulty a bougie of 5 mm. diameter. It was dilated up to a bougie of 10 mm. diameter. To date of reporting (February 26) the boy has only vomited once, and has gained in weight about a pound a day. Up to now he has never had solid food, but has lived purely on liquid or sloppy food.

Case 2.—Baby, aged eighteen months, was admitted to hospital on February 17, 1915, with history of daily vomiting since birth. Not emaciated. On examination the same day with the œsophagoscope, the whole of the thoracic œsophagus was found greatly dilated, but no food lying in the dilated area. The mucous membrane of the sub-diaphragmatic portion was found thrown into large transverse folds, but bougies, as well as the second largest Killian tube, could be passed into the stomach without any difficulty. There had been no more vomiting to date of report (February 26), and child can now eat bread and butter. This case is apparently of the same type as that of the congenital hypertrophic stenosis of the pylorus, which does so well with simple dilatation with Hegar's dilators through a gastrotomy opening. Skiagram shown, taken three days after dilatation.

Mr. HOPE said that since writing his notes he had obtained more history relating to the condition of the elder boy (Case 1). The child

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., July, 1915, p. 290.

had had solid food given to him, but this never reached his stomach. Sometimes he would keep a whole meal in the dilated œsophagus, or sometimes only a portion, and then vomit it up, this occurring eight, ten, or twelve times a day. There was no history of any corrosive having been swallowed. About four years ago he (the speaker) saw at Newcastle a case under Mr. Martin's care in which there was a very tight fibrous stricture in a child aged four, the stricture coming on directly after an attack of diphtheria. There was very marked scarring in the dilated upper part of the œsophagus, and one could not get even the finest filiform urethral bougie through the stricture. A gastrostomy had already been performed when the case was seen, and the child eventually died. Mr. Hope also said that the children in neither of his cases were emaciated, although they were never properly fed. Even the small child was quite well covered. With regard to the condition of the stricture in the small child, there were very marked rugæ seen at the lower end of the œsophagus, and dilatation certainly as big as was seen above the malignant stricture in any grown-up patient. Dr. Still rather thought that there was a predisposing condition of spasm. He knew that the existence of spasm was doubted, but Dr. Still appeared to think that there was such a thing in the case of the œsophagus, similar to the condition occurring at the pylorus in young children.

Æsophagus from a Child, aged two and a half years, showing Escharotic Stenosis.—**Dan McKenzie.**—History: In May, 1914, the patient swallowed half a teaspoonful of a poison for bugs. The mother induced vomiting by tickling the pharynx with her finger, and half the quantity was regurgitated. After swallowing the poison the tongue was protruded and swollen and the lips were bluish. Great limpness followed the swallowing of the liquid. After that he was unable to swallow solid food and sometimes not even liquids, the food returning before it entered the stomach. He came under my care on November 20, 1914, quite unable to swallow solids and semisolids, and only getting down small quantities of liquids. The X-ray examination showed complete impaction in the œsophagus, at the level of the sterno-clavicular articulation. Seven or eight attempts to dilate the stricture were made. All failed. At first I succeeded in passing fine tubes and bougies, but the immediate effect of these efforts upon the strictures was discouraging. Feeding was mainly carried on *per rectum*. After a distressing illness the patient died on February 1, 1915.

Pathological Report by Dr. Wyatt Wingrave.—(Esophageal stricture: The specimen was removed entire, from tongue to duodenum inclusive. About 3 in. from the cricoid level stricture commences abruptly and gradually diminishes towards stomach, involving about 1½ in. It consists of apparently dense cicatricial tissue involving both mucous membrane and muscle, with some extension to cellular tissue around. The lumen is reduced to 1 mm., only admitting a probe. Above the stricture the tube is dilated, and its mucous membrane is thrown into well-marked transverse rugæ, but not markedly reduced in thickness. Below it is not dilated, and the cicatricial tissue *gradually* ceases, not abruptly, as at the upper boundary. The stomach is very small and walls very thin, altogether smaller than a normal stomach at that age. Above and below the stricture the mucous membrane is normal, and there are no signs of present or past erosion in any part of the tract above or below stricture. The aorta is normal and there is no arterial aberrans.

Dr. DAN MCKENZIE said that Dr. Wyatt Wingrave felt very strongly

that the stricture in this case was more likely congenital stricture of the esophagus than due to corrosive fluid. He (the speaker) did not agree with him, but in justice to Dr. Wingrave and his opinion, he thought it only right that it should be stated.

Epithelioma of Pharynx, Tongue, and Cervical Glands in Male.—**W. Stuart-Low.**—Since the last meeting, when this case was shown,¹ the tongue, pharynx, and glands have, on three occasions, been treated by diathermy. Free incisions having been made over the enlarged cervical glands, and the tissue reflected, punctures were made in the stony-hard glands with beneficial effect, the enlargements being greatly reduced and the pain much diminished.

Rabbit's Vertebra in the Right Lower Bronchus removed by Superior Bronchoscopy.—**J. Dundas Grant.**—Bone swallowed twenty weeks before admission to hospital. Physical signs indicated bronchiectasis in the right lower lobe. Expectoration copious, extremely foetid, sometimes tinged like anchovy sauce, and 9 to 10 oz. daily in amount. Radioscopy confirmed these signs, and showed further a discrete dense opacity at the level of the fourth interspace anteriorly and the eighth rib posteriorly, probably foreign body.

Dr. Grant performed bronchoscopy and removed a rabbit's vertebra from right inferior bronchus at a distance of about 12½ in. from the teeth on February 18. The patient refused bronchoscopy under local anaesthesia (having previously been submitted to it elsewhere) and was, therefore, anaesthetised in dorsal position. The field of operation in the trachea and right bronchus was swamped with foetid, blood-stained mucus. The bone was removed by means of Killian's toothed forceps, and the bronchoscope had to be withdrawn along with it. There was no subsequent laryngitis, and the symptoms have nearly disappeared, the sputum now averaging 4 oz. daily, and later ½ dr. Dr. Grant said that at the time of the extraction he gave instructions for tracheotomy instruments to be kept at hand, but no need for them arose.

Removal of Epithelioma of Larynx.—**W. M. Mollison.**—F. B.—, aged forty-five, complained of hoarseness of about four months' duration. He was seen in November, 1914: there was then a sessile swelling about the left cord. Laryngo-fissure was performed. The whole left cord was removed, together with the tip of the vocal process of the arytenoid: the growth involved also the anterior quarter of the right cord, and the anterior half of this cord was also removed. The specimen is shown. Recovery was rapid. Two months later a distinct swelling was seen at the anterior commissure: this swelling is still present but much smaller. However, with suspension laryngoscopy, a small piece was removed which proved to be fibrous tissue only.

Dr. DUNDAS GRANT said that in such cases an apparent re-growth about the anterior commissure sometimes caused anxiety, but it was usually simply granulation tissue. It was thought to be more apt to take place when a suture was used, and it ultimately disappeared.

Sir STCLAIR THOMSON said that these appearances of re-growth always gave rise to anxiety during the first few months of convalescence. One learned by experience how to distinguish them. He thought that the fresh growth in this case was nothing more than a simple granuloma. These granulomas were much more pedunculated or semi-pedunculated

than the original growth. He pointed out that in this case, in addition to the fresh granuloma, there was a little red fleshy pimple, such as one saw over a piece of exposed cartilage.

Sir FELIX SEMON said that his own experience was that when apparent recurrence took place, one should not directly proceed to a second large operation. In the great majority of cases the apparent recurrence was only granuloma. He wished to lay emphasis upon this point. In a case of his, in which he had performed laryngotomy, a re-growth was discovered in the anterior commissure while he himself was away on holiday. Although he had suggested the possibility of simple granuloma, the family doctor had a second thyrotomy done, and, on pathological examination, simple granuloma was detected. After six weeks the patient came to him again for a fresh outgrowth in the anterior commissure, and he then followed his own principles, and removed it with forceps from within. It was a simple granuloma, and after its removal in this manner the patient remained perfectly well. He strongly advised any one who had a case of the kind not to perform at once a second big operation, but first to remove a piece of the growth for examination from within.

Fibroma in Naso-pharynx.—J. L. Irwin Moore.—Boy, aged sixteen, with growth—fibroma—in naso-pharynx, originating apparently from left half of sphenoid, and occupying the greater half of post-nasal space. The patient complained of difficulty in breathing at night and on eating food. There had been no spontaneous hæmorrhage. Opinions were invited as to best methods of removal.

Dr. DUNDAS GRANT thought this was a small-based fibroma, and its removal might be effected without any great anxiety. It could even be done, he thought, with the old-fashioned form of adenoid forceps with large spoon-blades.

Mr. HERBERT TILLEY said he would certainly oppose Dr. Grant's method of treatment most strongly. In the first place, on careful examination, this growth appeared to shelve up the posterior wall of the naso-pharynx—*i. e.*, he believed the growth was not pedunculated, but that it was a sessile fibroma, and probably very vascular. He would be sorry to tackle that with "adenoid forceps," or without a definite plan of campaign. It might be possible to remove it through the nasal passage. One authority had stated that he had never seen a nasal fibroma which could not have been removed through the nasal passages. But, assuming that it could not be removed in that way, this particular fibroma having a large base of origin, he would suggest making a Mure's incision (lateral rhinotomy), and treating the growth through the large opening thus made. It would then be an excellent case for diathermy. The growth was very vascular, and one ought to regard its removal as a serious operation. His suggestion, if acted on, would involve an external scar, but the patient was a very young boy, and if the operation was successful the scar would be unnoticeable in a few years' time.

Sir STCLAIR THOMSON said that Mr. Tilley had just spoken of the "nasal passages"; he took it that he included the mouth. All these extensions, although they might have secondary adhesions in the nose, in the sphenoid, and the antrum, could be extracted through the mouth. On this matter he spoke without any personal bias. He had not worked on such cases, but he had a great opportunity of seeing some of them in Paris, and Mr. E. D. Davis showed a very similar case at the last meeting of the Section—a case which was described as a fibroma of the naso-pharynx, a thing pathologically innocent, but clinically malignant. Mr.

Davis removed it through the mouth. He (the speaker), thought it a great pity to disfigure anybody by a scar through the nose. In Paris, they neither split the soft palate nor operated through the face. They placed their patient in a Trendelenburg position, and had their curettes working sideways, one cutting surface working one way and the other the other way, and passing up very quickly into the naso-pharynx. They had forceps—not adenoid forceps—ready to seize and wrench this growth out. Their great principle was to operate very quickly, otherwise the blood poured out. He had seen Georges Laurens, a leading laryngological operator of Paris, get it out so quickly that a sponge put into the naso-pharynx was all that was required.

Dr. DUNDAS GRANT said there was no such epistaxis as would be present if the growth was very vascular, and no deafness such as was usual when any infiltrating malignant growth occupied this region and extended to the Eustachian tube. He had not had the advantage of following up the result of microscopical examination or of digital palpation.

The CHAIRMAN said if the case was of the nature it was believed to be—namely, a naso-pharyngeal fibroma or angio-fibroma—then he would hesitate before attacking it with only adenoid forceps; although the principle of the adenoid forceps was one which might be developed and applied.

Dr. IRWIN MOORE explained that the patient came up to the hospital to be operated on for adenoids. After examining with the post-nasal mirror and feeling carefully with his finger, he came to the conclusion that the growth was a fibroma, on account of its extreme hardness. He was fortunate in coming across a case at such an early stage before extensive growth had occurred. Many years ago, when he first started practice, he had a patient with a similar growth, but so extensive that it hung down into the throat and the lower end could not be seen without depressing the tongue. He removed it through the mouth, using a hot platinum wire passed through the nose. He still had the specimen. The growth recurred, and the patient afterwards attended the Leicester Infirmary under Dr. Bennett. He once saw Sir Watson Cheyne operate on a similar growth which he believed was about the same size as the one exhibited. Having first done a preliminary laryngotomy, he split the soft palate and removed the growth by means of a periosteal elevator—the head hanging well over the end of the table. In reply to a question by Sir Felix Semon, the speaker said that, so far as his recollection went, there was not very much hæmorrhage. In his own case he was inclined to wait a little and see whether the growth grew rapidly. He thought there would not be much difficulty in removing it through the mouth.

Case for Diagnosis.—Cyril Horsford.—Patient, a male, aged sixty. Slight hoarseness since November, following on wetting of feet. His voice has never been clear since. His work does not entail much use of the voice.

Mr. CLAYTON FOX thought that this case would prove to be one of epithelioma. There was considerable infiltration of the left cord and slight impairment in its mobility. Of course, the Wassermann test should be taken, and iodide of potassium with mercury administered. If no improvement followed, a laryngo-fissure ought to be performed and the cord and adjacent tissue freely removed.

Mr. STUART-LOW said that he considered that the left vocal cord showed indications pointing to malignant disease.

Mr. HERBERT TILLEY thought that there was no doubt that the laryngeal growth was malignant. He pointed out that the anterior part of the *left* cord was quite white and the posterior red.

Sir FELIX SEMON thought it a beautiful case for laryngeal fissure. Without doubt it was malignant. The sooner the operation was performed the better would be the chance for the voice afterwards. He agreed that a Wassermann test should be taken.

Sir STCLAIR THOMSON said that it was doubtless clinically malignant. He raised the question as to whether the white on the opposite cord was white froth or was due to a little thickening there.

[*Postscript*.—Wassermann reaction negative. No improvement with potassium iodide—slow, but steady increase of growth up to this date, April 20. Patient has refused operation.—C. HORSFORD.]

INTERNATIONAL CONGRESS OF MEDICINE.

London, 1913.

OTOLOGICAL SECTION.

Mr. A. CHEATLE. *President, in the Chair.*

Abstract Report by DAN MCKENZIE.

Pharyngeal Drainage of Cranial Suppuration of Otitic Origin.¹

—P. JACQUES (Nancy).—Retropharyngeal abscess secondary to ear suppuration should be regarded as of critical importance. Three cases were narrated. One was a girl, aged three, in whom acute middle-ear suppuration led to osteitis of the floor of the tympanum followed by severe hæmorrhage from the meatus which was controlled by packing. Unilateral swelling of the pharynx appeared soon afterwards which when opened gave vent to a rush of venous blood. Tracheotomy and packing of the pharyngeal cavity had to be performed. In spite of a fresh and copious hæmorrhage the child recovered after a sequestrum of the tympanic floor was got rid of. The convalescence was interrupted by temporary paralysis of the pharynx and tongue due, it was supposed, to neuritis of the hypoglossal and of the nerves in the foramen lacerum posticum. The second case was that of a man, aged fifty, who was operated on for acute mastoiditis of a few weeks' duration. Drainage of the mastoid cells and antrum was found to be insufficient and the radical operation was therefore performed. Still the fever and constitutional symptoms persisted. A few days later an œdematous swelling appeared above the root of the zygoma. The retro-auricular incision prolonged forward towards the temple revealed a fistulous opening in the squama leading to an extra-dural focus of granulation tissue through which a sound passed towards the sphenoidal lobe without resistance. Discharge of non-purulent cerebro-spinal fluid followed. The symptoms still continuing, the bone of the squama between the fistula and the mastoid

¹ See also JOURN. OF LARYNGOL., RHINOL., AND OTOL., January, 1915, p. 12.

antrum was removed, in the course of which an abscess sac was evacuated in opening the antral roof. The pyrexia still persisted and the patient now began to experience pain towards the neck, with torticollis and deep sub-occipital puffiness. Incision and exposure of the base of the skull showed pus issuing from the cranium within the digastric fossa. The bone was cleared as far as the stylo-mastoid foramen and the occipital condyle posterior to the foramen lacerum. A few days later, while the temperature was falling dysphagia was experienced and an abscess in the lateral pharyngeal wall behind the posterior faucial pillar was discovered and opened. Recovery with some stiffness of the neck and difficulty in swallowing. The third case was that of a woman, aged forty-six, who developed acute otitis media and mastoiditis necessitating first the cortical then the radical mastoid with exposure of the lateral sinus. Torticollis supervened, with pain on pressure over the nape of the neck, showing a tendency for the suppuration to wander under the occipital bone. Later, dysphagia and the discovery of an abscess in the wall of the pharynx. This was opened and proved sufficient to drain the sub-occipital focus. Recovery with slight stiffness of the neck.

Retropharyngeal abscess may develop in two ways: First, directly along the petrous bone from the tympanum; secondly, indirectly, and consequent upon abscess formation secondary to the focus in the ear itself. The above cases exemplify the second of these methods. In these and similar cases a collection of pus forms under the occiput deep to the digastric groove and muscle, reaching that region from an extra-dural abscess of the cerebellar fossa. From this point in most cases the pus tends to infiltrate posteriorly towards the back of the neck, but in a few cases a weakness of the aponeurotic barriers, due to the passage through them of a vein, which the speaker described, permits the pus to gravitate towards the pharynx. The speaker suggested that in these cases an effort made to guide the pus towards the pharynx by raising the periosteum from the inferior aspect of the occiput after resecting the apex of the mastoid process and ligaturing the occipital artery might be advantageous, as pharyngeal drainage quickly cured these sub-occipital abscesses.

In reply to a question, Prof. Jacques agreed that retropharyngeal abscess was sometimes due to jugular phlebitis and sometimes to osteitis of the atlas or axis, both of which conditions had to be excluded before or during operation.

Secondary Suture after Simple Resection of the Mastoid Process.—**Holger Mygind** (Copenhagen).—This method, which was described by the speaker in full detail and illustrated by cases, consists in curetting away all soft granulations in the bone cavities, in mopping them out with iodoform gauze, and in permitting them to fill with blood. The edges of the skin wound are then undercut and brought together by Michel's clamps. The method is thus a modification of the blood-clot dressing. Naturally it is suitable only in cases which are free from any complication and in which the wound and the skin around it are quite healthy. The method was tried in ninety-one cases, mostly children and in twenty-four the blood-clot suppurated, and the wound had to be re-opened; in forty-two cases the healing was ideal. The method can be adopted in from eight to twenty days after operation.

Prof. MOURE (Bordeaux) had for years practised closing the wound, leaving a drain into the antrum. By so doing cure results in three or

four weeks. Should the wound become septic, the sutures can be divided and the skin re-united later on if necessary.

Prof. KUBO (Japan) practised regularly secondary suture after the simple mastoid operation in from one to three weeks after operation. Primary suture he found to be dangerous, as a concealed focus of pus may remain.

Dr. GORHAM BACON (New York) employed the method advocated by Mygind. The blood-clot method with immediate suture he had abandoned. He had found the blood-clot method with secondary suture useful after the radical mastoid when healing was slow.

Dr. F. L. JACK also disliked the primary suture over blood-clot, but Mygind's suggestion seemed to him to be more promising.

Prof. ALEXANDER (Vienna) recommended sterilised wick drains and dressings of antiseptic gauze, frequently changed so long as discharge is profuse.

Prof. FERRERI (Rome) employed primary periosteal-cutaneous suture in acute staphylococcus and pneumococcus mastoiditis limited to the mucosa of the antrum and not affecting the bone. In all other cases secondary suturing was employed when the granulations were healthy, and the loss of substance had not been excessive.

Prof. DENKER (Halle) warned against primary suture in cases where the operation had taken place before all the cells had been converted by the disease into one single cavity. In two such cases he had seen deep extra-dural abscess develop with erosion of the posterior semicircular canal.

Prof. MYGIND, in reply, said that in his experience, the microbic character of the infection had no influence on the healing process. He thought, also, that it was as easy to get primary healing in large osseous wounds as in small ones.

Osteomyelitis of the Petrous Bone.—**L. Bar** (Nice).—At times, in the course of acute or chronic suppuration of the ear, or even without any foregoing disease at all, osteomyelitis of the petrous bone manifests itself. The period of invasion is, as a rule, very short, and it is followed by a slower but progressive advance of the bone disease, and that even after the primary focus has been removed by operation. It is most commonly found in children and young people, presumably because the vascularity of the bone in early life provides a predisposing cause. The disease may advance to affect the whole of the skull-cap. Even when confined to the petrous region it is no less dangerous. Sometimes it is rapidly fatal, leading in the most serious cases to involvement of the facial canal, the dura mater, the lateral sinus, and the brain. Its progress is remittent in character, with a period of quiescence after each surgical intervention, but tending finally to a fatal issue because of the difficulty of eradicating the bone-infection. The speaker reports two cases.

(To be continued.)

Abstracts.

PHARYNX.

Rolleston, J. D.—Congenital Heart Disease and Ulcerative Sore Throat.
Royal Society Medicine—Section, Disease in Children—"Proceedings," February, 1915, p. 51.

Rolleston reports the case of a male infant, aged eleven months, who was admitted to hospital suffering from diphtheria on the eleventh day of the disease. There were membranes on the tonsils, faucial pillar, and uvula, and a profuse nasal discharge. There was marked ulceration of both tonsils. No Vincent's organisms. The ulceration gradually spread over the uvula and palate. Death took place from broncho-pneumonia.

Post mortem.—Heart: (1) Transposition of the great arterial stems; (2) deficiency of the inter-auricular septum; (3) an interventricular foramen; (4) stenosis and hypoplasia of the pulmonary artery.

The present case is no exception to the general rule, that cases of congenital heart disease are very liable to succumb to acute infection.

With regard to the nature of the infection in this case, it was not diphtheria, although there were a few organisms morphologically resembling diphtheria organisms.

Archer Ryland.

Poynton, F. G., and Higgins, T. T.—Persistent Pharyngeal Rudiment.
Royal Society Medicine—Section, Diseases in Children—"Proceedings," February, 1915, p. 60.

The specimen was removed from a female, aged five months.

The tumour was pear-shaped and attached by a narrow fibrous stalk to the left lateral pharyngeal wall, exactly in the supra-tonsillar fossa. On section it showed a piece of cartilage in the substance of the tumour.

Microscopic examination: Normal skin on outside showing compound epithelium, hair follicles, and sebaceous glands, with considerable fibrous tissue in the subepithelial planes, as well as fat.

Archer Ryland.

Goerke, Max.—Tonsillectomy: Indications and Results. "International Archives of Laryngology, Otolaryngology, and Rhinology," May-June, 1914.

The author reiterates the hypothesis of the defensive *role* of the tonsils. In addition to infections, for which many hold the tonsils responsible, he cites a much extended catalogue, including even osteomyelitis, vasomotor hyperexcitability, phlebitis, gastric ulcer, and anterior poliomyelitis. The author then at elaborate length postulates, as if new, the old hypothesis that the tonsils, after performing their functions, involute. Such involution does not begin until the age of twelve, and enucleation should not be performed at a younger age than this. In these younger patients, alternatives are tonsillotomy, painting the crypts with tinct. iodi., or irrigating them. Adenoids removed at the age of two or three recur, but nevertheless such early procedures may be necessitated by nasal obstruction or middle-ear disease. Even in adults there may be a pseudo-recurrence of the faucial tonsils, after complete removal, owing to the lingual tonsil growing out laterally into the tonsillar fossæ.

While pleading for conservatism, the author admits that sepsis and hæmorrhage are just as likely after partial as after complete operations. His own happy experience in never having had to use clips for the

pillars he attributes largely to previous infiltration with novocain and adrenalin.

Finally, in considering indications and contra-indications in any individual case, we must regard as absurd the theory that the body contains any organ possessing no function other than to flood the organism with poisons, and the author therefore utterly disagrees with the statement of Bosworth, that "the existence of tonsils should be regarded as a disease."

H. L. White.

NOSE.

Bliss, M. A. (St. Louis).—The Importance of the Paranasal Sinuses in the Explanation of Pain in the Face, Head, Neck, and Shoulders. "Amer. Journ. Med. Sci.," February, 1915.

Some two years ago the writer, in conjunction with Dr. Greenfield Sluder, reported some observations on the relation of the branches and ganglia of the fifth cranial nerve to the accessory sinuses of the nose. Both at that time and subsequently he has attempted to prove that the nerve-trunks and ganglia (particularly the sphenopalatine ganglion) are influenced by infection of the sinuses, and that widespread referred pain may originate from this cause, and may resist all treatment unless its origin is recognised.

It is believed that inflammation in the sinuses or in the nasal cavity proper may involve the ganglion and give rise to the following symptom-complex: Pain at the root of the nose, around the eyes, and in the jaws and teeth, extending backwards to the zygoma, ear, and mastoid, and spreading to the occiput, neck, scapula, and breast, and when severe to the arm, forearm, hand, and fingers. In certain cases the pain is accompanied by itching of the skin of the upper limb, disturbance of taste, and a sense of stiffness and weakness of the arm. In addition there are diminished sensibility of the soft palate, pharynx, tonsils, and nasal mucous membrane on the same side, while motor phenomena take the form of elevation of the soft palate on the affected side with deflection of the uvula to the opposite side.

Although the entire symptom-complex is rarely seen, the author has recently met with cases which exhibited all the features mentioned. In some of them cocaineisation of the area of the sphenopalatine ganglion relieved the pain for a time. In others the pain was thought to be due to neuralgia of the Vidian nerve, the latter being exposed in the floor of a suppurating sphenoidal sinus.

The treatment of cases of sphenopalatine ganglion neuralgia is difficult and often at first disappointing, the nerve-cells being much less easily destroyed than are nerve-fibres, but the author has met with a considerable degree of success as a result of injection with alcohol, the ganglion being reached with a straight needle from below the posterior end of the middle turbinal, or by means of a curved needle entering through the sphenopalatine foramen. Experiments on the cadaver have proved that the ganglion or its immediate neighbourhood may be thus injected in most cases.

Thomas Guthrie.

MISCELLANEOUS.

Gradenigo, G.—Dry Pulverisations obtained by the Author's Method. "International Archives of Laryngology, Otology, and Rhinology," May-June, 1914.

After using this technique the vapour may be found microscopically in mucous membranes as droplets, crystals, or granulations, from 1 to 8μ in diameter. Heat is unnecessary, wherefore there is no risk of alteration in the chemical state of the medicament. Stefanin has made a model of the tracheo-bronchial tree, whose smaller (? tertiary) bronchioles have a diameter of $\frac{1}{10}$ mm. and a length of 20 c.m.; their lumen is painted with glycerine to simulate mucus. Experimentally, the lower in the tract one proceeds, the more rapidly is the vapour absorbed; moreover, the particles carried by this method bear a charge of electricity, which also must have some effect on the organism. The author specifies the various drugs tried, and says that for some—*e.g.* soluble calcium salts—absorption is more rapid than by ingestion or hypodermically.

The therapeutic field of action is wide, and includes catarrh of the respiratory tract, sinusitis, atrophic rhinitis, and the pharyngeal paræsthesie and "phonasthesie" of singers and orators. In carcinoma, or tuberculosis of the larynx, the method may simply aggravate the lesion. In gouty disorders renal elimination is helped by iodides given by this method. In the host of modern therapeutic uses of calcium lactate the method is better than by the mouth, because in the latter case absorption is erratic and the soluble lactate becomes the insoluble phosphate. For pulmonary phthisis the system, proposed by some authors, of finely pulverising insoluble calcium salts by purely mechanical means is not free from the danger of creating an artificial pneumo-coniosis.

H. L. Whale.

Cheyne, Sir W. Watson.—The Antiseptic Power of Iodine. "Treatment of Wounds in War." Hunterian Oration, Roy. Coll. Sur., 1915. "Lancet," February, 1915.

The subject of this oration was an important and far-reaching pronouncement regarding the practical value of iodine as an antiseptic in wounds.

While admitting that he had always been "under the impression that iodine was quite a useful antiseptic," he was afraid that such a view could no longer be held, as his experiments had proved its inefficiency.

An exhaustive series of tests were made with iodine, carbolic acid, double cyanide of mercury and zinc, bichloride of mercury, salicylic acid, oils of cinnamon, origanum, and eucalyptus, izal, cyllin, lysol, balsam of Peru, trikresol, etc., both *in vivo* and *in vitro*. The conclusions arrived at were that the best medium for plugging was a paste consisting of: Lanolin, 6 parts; white wax, 1 part; mixed with 20 to 30 per cent. of trikresol or carbolic acid. Iodine proved a complete failure. The high toxicity of carbolic acid made it inferior in practical value to trikresol. The chief point established was that, although mixed with a fatty base, the trikresol showed great diffusibility into the surrounding medium.

This pronouncement, in view of the wide faith in iodine as an efficient antiseptic, appeals specially to aural surgeons, and should be read in full.

Wgatt Wingrave.

REVIEW.

Index of Differential Diagnosis of Main Symptoms. By various writers. Edited by HERBERT FRENCH, M.A., M.D., F.R.C.P., with sixteen coloured plates and over two hundred illustrations in the text. Bristol: John Wright & Sons, Ltd.; London: Simpkin, Marshall, Hamilton, Kent & Co.; New York: William Wood & Co. 1912. Pp. 1017.

The differential diagnosis of main symptoms is the everyday occupation of every practitioner. This is particularly the case with the consultant who has generally to make and state his diagnosis as categorically as possible at the end of one examination. The general practitioner, on the other hand, has often, from circumstances beyond his control, to postpone the making or, at all events, the stating until he has made several examinations. One of the circumstances may be the enormous difficulty of having the main symptoms of all the many varied diseases he has to consider before his mind in orderly grouping at any given moment, though he may have acquired that unconscious power of scenting out the sources of danger when present or threatening before he can formulate the diagnosis of the disease in terms of pathology. When in doubt as to the diagnosis at one sitting he would gladly refer his difficulty to some more skilled counsellor who would consider the symptoms in the order in which they have presented themselves to the practitioner himself. If this friend is able and willing to marshal and analyse the symptoms according to their diagnostic importance, and point out to the practitioner the diseases in which they are found, with a consideration of the features by which these particular diseases are distinguished from each other, a great ideal is attained. Not merely is the practitioner led on to firm ground in the special instance, but is by such a discussion fore-warned against future difficulties and very beneficially fore-armed in his struggle to overcome them. Such an able and willing friend is offered to the practitioner in the work before us. The book is a large one because the range of its scope is a very wide one, but the articles are very concise, while full enough to make the matter clear. As evidence of the width of range in the list of contributors we notice, in addition to physicians as such, a bacteriologist, an ophthalmologist, several surgeons, a dermatologist, an orthopaedist—all recognised authorities in their particular lines. Among the physicians we may further differentiate special authorities on diseases of the chest, the nervous system, on gout and rheumatism, diseases of children, cancer, the application of electricity and X rays.

To suit some tastes, we presume, the articles are arranged alphabetically. Thus deafness comes between cystinuria and deformity of the chest, tinnitus between tinea and tremor. The paragraphs on deafness and tinnitus respectively contain, however, a wonderful amount of guidance on these two subjects in extraordinarily small space. If we turn to the admirable general index we find the able friend "at his most willing," and the practitioner in a difficulty in the diagnosis of some obscure or ordinary case (as will happen to the best at times) will find guidance ready to his hand if he has this index beside him.

The editing has been undertaken by Dr. Herbert French, a large amount of the work has been carried out by Dr. Farquhar Buzzard, and among the collaborators we find Sir Malcolm Morris, Dr. Robert Hutchison, Dr. Frederick Taylor, and many who are also among the best known. There are numerous illustrations and plates of the highest instructional value filling necessary places and not placed merely to fill up. A reprint

has already been called for, although sufficient time has not elapsed for the edition to get out of date. This evidence of the value of the work we can thoroughly confirm as the result of our own use of it.

Dundas Grant.

NOTES AND QUERIES.

PARALYSIS OF LEFT RECURRENT LARYNGEAL NERVE IN MITRAL AFFECTIONS.

Osler, in the *Arch. des Maladies du Cœur des Vaisseaux et du Sang*, February, 1909, pointed out that there are two kinds of conditions in which valvular affections of the heart may give rise to the impression that there exists an aneurysm of the aorta. First, in aortic insufficiency, the throbbing of the heart may lead one to suspect aneurysm, particularly in young subjects, where the systolic pulsation of the aorta may be very marked; secondly, in mitral lesions, when great dilatation of the left auricle exists and when this dilated chamber compresses the left recurrent laryngeal nerve. In most of those cases reported in which with mitral disease there has been left recurrent laryngeal paralysis, it has been shown that the nerve has been compressed between the aorta and the dilated auricle; in some the enlarged pulmonary veins compressed the nerve, and in a case of Fischauer's the left branch of the pulmonary artery compressed the nerve. In some cases both recurrent nerves have been paralysed, and such cases have been explained by assuming that the weight of the dilated and engorged heart has drawn down the arch of the aorta and its large branches so as to irritate and cause atrophy of the recurrent nerve loops. The author quotes three cases which have come under his direct observation. The first patient, a woman, aged forty-five, had suffered from heart disease for some years. She was fat, the hands were somewhat cyanotic, and there was marked dyspnoea on exertion. The apex beat could not be felt; a faint thrill was detected, and the area of cardiac dullness appeared to be increased; there was no pulsation to be seen or felt to the left of the sternum, nor was there any tracheal tugging. An apical presystolic murmur was heard, also a systolic murmur conducted to mid-axilla. The voice was double-toned, and the left vocal cord was paralysed. Death took place about fifteen months later, and at the *post-mortem* examination the mitral orifice was found stenosed and the left auricle greatly dilated; there was no aneurysm. The second case was a woman, aged twenty-seven, who gave a history of scarlet fever and whooping-cough in childhood, and a mild attack of diphtheria some months previously, since when she had been ailing. When seen by the author the typical signs of mitral stenosis were present, and for a year her voice had been altered in character; this was found to be due to paralysis of the left recurrent laryngeal nerve; the apex beat was in its normal position; there was a well-marked presystolic thrill, and cardiac dullness commenced at the third rib. A loud presystolic murmur was heard, followed by a ringing first sound. A short, loud systolic murmur was also present, and the pulmonic second sound was accentuated. About one year later recurrent paralysis still existed, and death occurred about six months afterwards. The third case was a man, aged forty-eight, in whom an aneurysm was suspected. There were oedema of the legs and of the bases of the lungs, dyspnoea and signs of grave asystole when seen by the author. Cardiac pulsation was seen in the third, fourth, fifth, and sixth left interspaces, and also in the second left interspace. On auscultation the double murmurs of aortic and mitral disease were found; the voice was bitonal, and the left recurrent nerve paralysed. Improvement in the patient's general condition occurred: X-ray examination showed a very much enlarged left auricle and absence of aortic aneurysm. At the *post-mortem* examination, on opening the pericardium, the appendix of the right auricle was found to reach to the left sternal margin, and the rest of the anterior surface of the heart was formed by the right ventricle; the aortic valves were incompetent; the mitral orifice admitted two fingers, the tricuspid three. All the cavities of the heart were dilated, and the heart generally much hypertrophied. The left auricle was enormous, the aortic valves were sclerotic, the mitral flaps thickened, also the chordæ tendinæ, and the mitral orifice somewhat narrowed. The left recurrent nerve appeared sclerotic and of an opaque white appearance in that part which was compressed between the left auricle and the aorta.

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THE EXTERNAL OPERATION ON THE FRONTAL SINUS.

By ROSS HALL SKILLERN, M.D.Phila.

It was thought that the last word had been said for all time when Killian brought out his bridge method for operating upon the frontal sinus. This is true as far as radicalism is concerned; however, in our country many potentialities force themselves into consideration which in Germany and Austria are completely ignored, at least as far as the ordinary patient is concerned. I refer to the after-effects of the operation. These include permanent defects or disfigurement (œdema of eyelids, sinking in forehead, contraction of scar, fistula formation) as well as neurosis (hemispherical anæsthesia, neuralgia, paralysis of upper lid, and diplopia), not to speak of the formation of crusts and scabs in the nose with its attending dryness. When we reflect on these possibilities it is with no little hesitation that we broach the subject of a complete Killian to one of our better-class patients. The reason is perfectly obvious: he or she must run the risk of one of these after-effects, the operator must assume the responsibility, and the diseases may not be cured. (In the latter instance I refer particularly to those cases which have complained only of an old, chronic discharge.) However, the fact stares us in the face that something must be done, and that something must take the form of an external operation, it being presupposed that internal operations including all

forms of treatment had been applied. This brings us to the gist of our argument. What forms of external radical operation shall we advise our patient? Before attempting to answer this question let us briefly consider the indications for this radical procedure. These indications may be divided into the absolute and relative.

By the absolute I mean those cases in which the disease has made such progress as to seriously threaten some neighbouring organ and even life itself. Threatened or actual cerebral and orbital complications occupy chiefly this category, and here the prompt performance of the operation is essential for the continuation of life. Other indications which may be classed as absolute, although by no means as urgent as those previously mentioned, are:

- (1) When the subjective symptoms are severe enough to interfere with the business pursuits of the patient.
- (2) When severe exacerbations occur.
- (3) In abscess or fistula formation.

The relative indications depend largely upon the patient himself as well as the proclivities of the attending surgeon. The following, however, may be considered typical:

- (1) When headache continues with no apparent change in the amount or consistency of the secretion.
- (2) When, despite frequent irrigations, the pus continues foetid, even though diminishing slightly in amount.
- (3) When the X ray shows a large sinus with many ramifications and the disease does not appear to yield satisfactorily to internal treatment.

Assuming, then, that no doubt existed as to the indication for an external operation, we again revert to the question as to what form of operation is advisable. Prejudice and bias for any particular method should be thrown to the winds, and we should consider only the future welfare of our patient in deciding this momentous event. At this point, however, two conditions may confront us which in themselves leave us without a choice and demand certain forms of surgical procedure. I speak of the pathological condition present and the anatomical configuration of the parts.

If internal rupture has occurred, causing cerebral or orbital complications, it will be necessary to remove structures regardless of everything else until the parts are sufficiently exposed as to insure the best probable results. This may necessitate sacrificing both the anterior and inferior as well as more or less of the posterior

or cerebral wall in the endeavour to remove diseased structures, procure sufficient drainage, and save life. If the patient survives the cosmetic result may leave much to be desired, but this deformity is far more acceptable to him than a smooth, unwrinkled forehead coupled with a shroud.

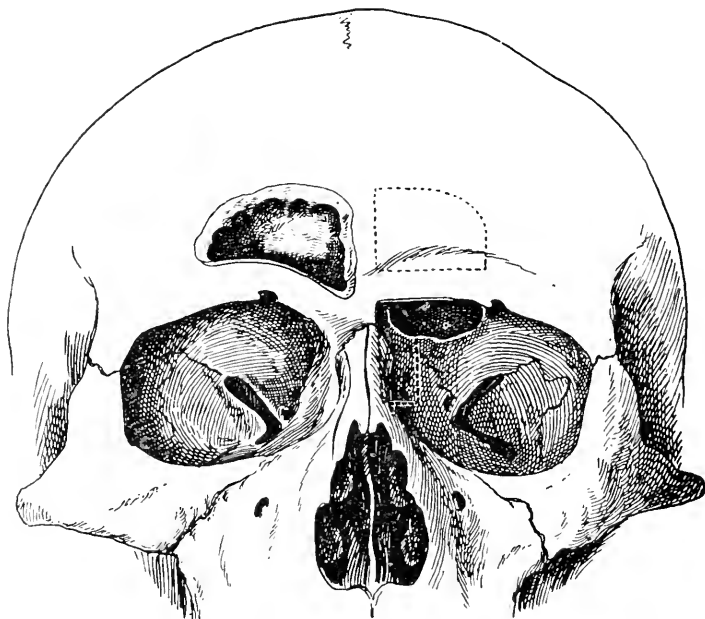
Again, if necrosis of one or more of the walls has occurred with external rupture, the destruction of bone may make it impossible to carry out an idealistic procedure in that particular case, one being obliged to resort to the operation of second choice, or, indeed, to one that will be adaptable regardless of its general desirability.

The anatomical configuration of the sinus may also play an important part in the choice of the particular method to be adopted. If the sinus does not extend high in the forehead, it may be entirely unnecessary to make the opening above the supra-orbital ridge, while in shallow cavities the bridge, as advocated by Killian, may be, with certain limitations, omitted. Again, lateral extensions toward the malar bone naturally require a longer incision and a larger area of bone resected than for extensions posteriorly. It is, of course, presupposed that all of these points have been thoroughly studied by means of appropriate skiagrams.

Given, then, that we have decided to operate upon a case of chronic frontal sinusitis which presents nothing unusual either in the course of disease or in the site or extent of the sinus, what shall we first consider in performing the operation? To choose and apply surgical measures that will give us the best possible result with the least possible intervention. Let it be here well understood that thoroughness is not to be sacrificed for expediency, but rather over-radicalism is to be curbed and a safe and sane course followed. The complications which can follow the external operation may be much more annoying to the patient than the mere deformity, as the latter can usually be corrected with paraffin, or, at the worst, a plastic operation; therefore it is the former which must be guarded against, keeping, however, the possibilities of subsequent deformities always in mind.

With this end in view, and from previous experiences with the Killian, Jansen, Kuhnt, Riedel operations, I have devised a slight modification of the Jansen operation, which prevents the depression in the forehead and at the same time allows the operator an excellent approach to the ethmoid capsule and places in a safe position for protection that bugbear of the frontal sinus operator—the lamina cribrosa. The principles of this operation are to spare the anterior wall, but to obtain the requisite space by resecting the

superior internal portion of the margin of the orbit and the floor of the sinus, thus exposing the entire lower portion or funnel of the frontal sinus (Fig.). After this has been done the usual procedures are followed, *i. e.* removal of the diseased mucosa, the ethmoid cells (and, if necessary, the sphenoid is opened), the communication with the nose may be enlarged to any desired size by merely removing the orbital plate piecemeal with the bone forceps. The wound is closed and dressed in the usual manner.



Killian method of bridge formation on right. Straight method with outline of portion of anterior wall to be removed on left.

Beside the advantage of room gained, all deformities resulting from depression are obviated. The operation is easier to perform than the full Killian, and being less extensive naturally requires less time. The only theoretical contra-indication that comes to mind is where the sinus extends far upward on the forehead in finger-like projections. In these cases it may be necessary to resect the bone to the end of the projections to avoid the formation of a subsequent fistula.

The sex factor is another point of considerable importance in choosing our method. In a young, unmarried woman we would naturally abstain from an incision which in the male sex would be considered a matter of course. We must, however, always bear in

mind that an external operation partially done is often worse than the most extensive radical, for there is every chance that a recurrence will take place, most likely with fistula formation, which will not only necessitate a secondary radical but its period of long after-treatments and subsequent disfiguration as well.

The method, then, to be chosen depends, as we have seen, upon many eventualities; we should carefully consider the facts before us in each individual case and operate accordingly, taking as a maxim to eradicate all of the diseased area with the least possible surgical interference, but not sacrificing thoroughness to expediency.

FROM THE EAR, NOSE, AND THROAT DEPARTMENT OF THE JOHANNESBURG GENERAL HOSPITAL.

BY J. C. G. MACNAB, M.D.Glas., F.R.C.S.E.

A. A MODIFICATION OF SKILLERN'S PRETURBINAL OPERATION ON THE MAXILLARY SINUS.

In the *Laryngoscope* for November, 1911, Ross Skillern described a new operation, which he called "preturbinal," for exposing the maxillary sinus, and which, to my mind, appeared very sound, and a distinct advance on any other operation, even the recent one of Watson-Williams. As I was fortunate in having four cases on hand which were being treated with daily puncture and irrigation, I submitted them all to this preturbinal operation, and carried out Skillern's method in every detail, but soon found out at least three disadvantages:

- (1) The dressings were always very painful.
- (2) The opening had a great tendency to close up.
- (3) It was impossible to know when to leave out the packing.

Accordingly I was disappointed with the result and now have modified the operation, making it partake of a more or less radical operation. Having completed the operation as described by Skillern the antrum is filled with the French embalming lotion (iodoform, menthol, eucalyptol, balsam, perm., ether), which is allowed to remain five minutes. A small curette is now employed to irritate or freshen the mucous lining of the antral floor for about a centimetre adjacent to the nasal floor. The ridge of bone having been carefully polished down, with a scissors the lining of mucous mem-

brane of the outer nasal wall is cut through close to the insertion of the inferior concha and folded neatly on the antral floor, being kept in place by packing the antrum with one inch bismuth gauze which has been previously boiled in parolein. This remains forty-eight hours, and should the mucous flap show any tendency to curl up the antrum is repacked. Seldom has it been necessary to repack more than once. The patient has now a common antral and nasal cavity all under the inferior turbinate, as no part of that bone has been sacrificed, and one can go on washing the cavity out without any discomfort. It also necessitates seeing the patient only once a week or so. All the cases operated upon primarily after this modification have been well within five weeks, some shorter.

B. THREE CASES SHOWING THE SHOULDER-ARM-HAND SYNDROME OF PARANASAL SINUS DISEASE CURED BY OPERATION.

In the February number of the *American Journal of Medical Sciences* Bliss, of Washington, reported examples of the above condition, and within six weeks three cases presenting a similar syndrome turned up about a week apart from each other. They occurred in males between the ages of twenty and forty years, and all complained of the shoulder-arm-hand pain. One was sent on account of tonsillar pain of two years' duration, the upper limb pain having lasted over three years. Two of the cases had also occipital pain. The nasal cavity showed in one case septal deviation to the affected side with a crowded middle turbinate, and a faint trace of muco-pus in the olfactory cleft. In the other two cases there was enlargement with polypoid degeneration of the mucous lining of the middle turbinate, but in these cases little pus was detected anteriorly even after shrinkage with adrenalin. However, all had sufficient evidence for an exploration of the posterior ethmoids and sphenoids. When it was seen that the main pathological condition was enlarged cystic cells easily broken down and lined with unhealthy and diseased mucous membrane, as complete an exenteration of the posterior cells as possible was carried out, while the whole anterior wall of the sphenoid was removed. Within a comparatively short time all acknowledged that their symptoms were decidedly better, but it is too short since to be able to say whether there will be any return. In fact, however, two are at present quite well. It is difficult to account for this referred pain, at least anatomically, but that it does occur is quite evident from the reported cases.

C. TWO CASES OF THE "GRADENIGO" SYNDROME IN CHILDREN EIGHT AND TEN YEARS RESPECTIVELY.

These cases are somewhat similar and will be described together. They had acute influenza, and about the tenth day of their illness acute temporal pain developed, followed by a discharge from the ear and abducens paralysis. On seeing them, the ears were discharging freely, but both were complaining of intense pain over the temporal region and of seeing double on looking towards the affected side. As in both cases there was distinct evidence of mastoid involvement mastoidectomy was done and the dura lifted off the posterior surface of the pars petrosa towards its apex, and although one showed no evidence of disease in the apical cells, in the other the small curette freely opened up one large cell which was full of a sero-mucous fluid. Gauze drains were put into both, and the external wound packed. Both healed within six weeks, and about the same time the abducens paralysis disappeared and vision returned to normal. The influenza bacillus was present, pure on cultivation in both cases.

D. TWO CASES OF NEURITIS OF THE LESSER OCCIPITAL NERVE FOLLOWING ACUTE OTITIS MEDIA SUPPURATIVA.

The first case was in a male of about forty years of age, who developed an acute otitis media. Paracentesis was followed by recovery of the ear condition, but within three months he developed acute agonising pain over the distribution of the lesser occipital nerve (second cervical), which lasted without remission for over four months. As all the usual treatment failed to give relief, and as he had been thoroughly incapacitated from work, and having developed a torticollis towards the affected side, there was nothing left but incision and exposure of the nerve at its root, which was carried out, when it was discovered that a small gland the size of an ordinary horse-bean surrounded the nerve (or the nerve was passing through the middle of it). Removal of the gland entirely cured the patient.

The second case also occurred in a male, aged thirty-six, who about two years ago developed an acute otitis, which burst the membrane and discharged for over six weeks, but finally healed with complete restoration of hearing. In these six weeks he complained of pain not only over the distribution of the lesser occipital nerve but also over the course of the great auricular, accompanied

by painful ulcers which took months to heal and have left permanent cicatrices. Having been well for some months he went to German S. W. Africa on active service and developed a similar condition, the small ulcers taking about the same length of time to heal, following closely the distribution of the great auricular nerve, viz., skin over the parotid gland and auricle, that part, namely, the lobule and lower part of the concha, supplied by the nerve. The intense neuralgia did not disappear, however, until incision and resection of an inch of both nerves was undertaken, and even now, four months since the operation, he has still some pain along the spine at the region of the second and third cervical nerve-roots. This was evidently a trophic lesion of the spinal ganglia on the posterior nerve roots and analogous to a herpes zoster in other nerves. But what relation has the condition in these two cases to the acute otitis, if any?

E. CASE OF MONOCULAR DIPLOPIA OF THREE YEARS' STANDING
CURED BY EXENTERATION OF POSTERIOR ETHMOIDS AND OPENING
OF SPHENOID.

The patient, a female, aged forty-five, consulted me for pain in her left tonsil extending down her throat, but there was no lesion there to account for it. Her left nasal cavity posteriorly showed the polypoid remains of a middle turbinate which had been partially removed about four years ago. Post-rhinoscopically a discharge of pus was seen oozing from the posterior cells and sphenoid. On inquiring further about any other symptoms, she stated that she had double vision in the corresponding eye for which she had received all forms of treatment at the hands of various oculists. This double vision varied, and it was always very marked when she had a cold in her head, to which she was exceedingly liable. Under local anæsthesia the cells were enretted after the method of Hajek and the sphenoid freely opened up. Since then she has had no diplopia, and it is now over three months since the operation.

F. ACUTE STREPTOCOCCAL INFECTION OF THE TRACHEA IN AN
INFANT, AGED FIFTEEN MONTHS.

This infant became suddenly ill one evening with extreme difficulty in breathing and remained so for about a week. On two or three occasions the question of tracheotomy was discussed by the two medical men in attendance, but as the child did not get

appreciably worse it was postponed, and the child sent on for diagnosis. X-ray examination revealed nothing, but under light general anæsthesia the small tube bronchoscope was passed through the glottis, when it was seen that down to the tracheal bifurcation thick, yellowish, dirty, tenacious membrane surrounded the whole interior of the tube, diminishing its calibre by one half. A swab taken directly through the bronchoscope on cultivation revealed a pure streptococcus.

Under urotropin and calomel the child recovered in ten days, and has remained well since.

G. ANKYLOSIS (FALSE) OF RIGHT CRICO-ARYTÆNOID ARTICULATION.

The patient, a female, aged thirty-six, was stung by a mosquito on the nose last year, which was followed by intense erysipelas of the face and later on by a polyarthritis of toxic origin. During the height of the arthritis she lost her voice—at least she could only speak in whispers. After a severe illness lasting eight weeks she recovered, with the exception of her speech. On examination three months afterwards the right vocal cord was seen to be immovably fixed on the middle line, the left moving freely both on inspiration and phonation, but it was wavy along its border and more or less concave towards the middle line, thus showing slight paresis of the corresponding internal tensors. With a probe it was possible to move the right arytenoid very slightly. Under pot. iodid., sod. salicylate ionization, sinusoidal faradisation, and massage the patient regained the use of her voice, the cord moving somewhat better although by no means entirely freely. Was this an arthritis of the joint the result of the same toxin as invaded the other joints?

H. (?) CONGENITAL CLOSURE OF THE LARYNGEAL PHARYNX.

The patient is a female, aged seventeen. Although she was fourteen when first coming under my care, as the case has been a decided puzzle, having seen no record of such a condition in literature, I may not be quite accurate in my description.

Three years ago the patient was sent on account of gradual increasing shortness of breath; for five years before this had been observed coming on very gradually until when first I saw her. She could not walk ten yards without requiring to sit down to get her breath. Going up three steps of a stairs took her breath away. She spoke quite easily, although without any powerful intonation.

She had had no previous illness save that tonsils and adenoids had been removed. Wassermann negative.

Examination with the laryngoscope. Shows no arytaenoids, no epiglottis, but a veil coming from the base of the tongue over the epiglottis, blending with the glosso-epiglottic folds and laterally losing itself in the lateral walls of the pharynx. The veil extends straight across posteriorly over the arytaenoids, which can be seen on phonation moving under it, and laterally it seems continuous with the ary-epiglottic folds, spreading externally to be lost also in the lateral walls of the pharynx. On bronchoscopic examination a small opening was seen between the posterior borders of the arytaenoids leading on to the cords anteriorly, but it was impossible to pass any instrument into the trachea. The vocal cords appeared very much under size, thin, and attenuated. The question arose, what was to be done? She had gone through the hands of many medical men without benefit.

I decided to have an examination from below, and accordingly submitted her to the serious and extensive operation of subhyoid pharyngo-laryngotomy, having a few days before performed a preliminary tracheotomy, and from below the hyoid removed a small (very small) epiglottis, and, having examined the cords which as above described were more like silk threads than anything else, attacked the veil, which was of a thick fibro-fleshy nature, removed as much as I considered necessary from the ary-epiglottic folds, and, leaving a space between the opening through which I could pass the finger in the bucco-pharynx, I stitched the whole wound, which healed by primary union. For six months she remained perfect in every way, speaking well, and able to run up stairs, but gradually the old shortness of breath returned, and on examination the opening made at the operation was seen to have so nearly closed that the tracheotomy tube which was removed within a week of the operation had to be reintroduced. For six months after I kept the small opening into the trachea open with bougies, but the more I enlarged it with nibbling forceps the sooner it recontracted, until six weeks ago, when, as far as the instrument would allow, I divided the whole veil antero-posteriorly with a diathermy knife, and as yet there is no tendency to recontract, but I purpose dividing it laterally also. She now speaks well and can do without the tracheotomy tube which she has worn for over a year. I will be pleased to have any enlightenment *re* this case.

HERPES ZOSTER OTICUS COMBINED WITH RECURRENT LARYNGEAL PARALYSIS.

BY DAN MCKENZIE, M.D., F.R.C.S.E.,

Surgeon, Central London Throat and Ear Hospital.

THE subject of geniculate or otic herpes has been brought before the readers of the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY several times during the last eighteen months, and the increasing number of cases which have been reported recently in this country and abroad tend rather to show that the disease is by no means uncommon. That being so, the following case would not have been put upon record had it not been that it is the first, as far as I can discover, in which the aural and facial symptoms were associated with laryngeal paralysis. This combination, as Ramsay Hunt has shown, was quite to be expected from what we know of the tendencies of the disease. The wonder is that it has never been described before. But there may be some reason for this, as we shall see later on.

As a perusal of the notes of the case will show, the laryngeal element was merely part of a widespread attack upon the cranial nerves, and the laryngeal paralysis has been given prominence in the title simply because of the rarity of that feature, and because it is more likely to prove interesting to oto-laryngologists.

The patient, a male, aged thirty-two, came to the Central London Throat and Ear Hospital on May 28, 1915, complaining of severe pain in the right ear and "twisting of the face."

The history is as follows: Three weeks previous to his coming to hospital he experienced slight headache in the right frontal region. On May 21 aching, together with an occasional pricking sensation, began in the right ear. He had always been slightly deaf on this side, but the deafness now became worse.

On May 22 he was attacked by a "sore throat," which his doctor diagnosed as tonsillitis. On the same day he noticed that he was hoarse.

Two days later (May 24) the ear began to swell and to become disagreeably hot and burning.

The facial paralysis was first observed by the patient the day before he came to hospital, that is to say on May 27.

Present Condition, May 29.—The patient looks and feels very ill apart from any local discomfort. The face is pale and pinched; the pulse 70; the temperature subnormal, and there is some inclination to shiver.

There is almost total right-sided facial paralysis, the only exception being the palpebral fibres of the orbicularis palpebrarum, which have still sufficient tonus to keep the lower eyelid in contact with the globe.

There is an extensive eruption of herpes distributed as follows:

External Ear.—The entire auricle is red and swollen, looking as if it were affected with erysipelas, save that the colour is of a dusker red. Yesterday there were no vesicles upon it, but to-day the fossa of helix is filled with a large bleb, the product, obviously, of the confluence of several individual vesicles. The posterior surface of the auricle is also red and swollen, but there are no vesicles upon it. The *tragus* is quite normal; it is neither swollen nor does it present any vesicles. On the *mastoid region* also there is neither inflammation nor vesicles.

Scalp.—There are three clusters of vesicles in the scalp above the right ear, and grouped in a semicircle 2 in. above and behind the auricle.

The *external auditory meatus* was filled with *débris*. On this being removed the posterior wall of the meatus was seen to be swollen, and the presence of a discharge of blood-stained serum indicated that there were broken vesicles somewhere upon the wall, but I was unable on examination with the speculum to detect the site of the eruption. The anterior meatal wall, like the *tragus*, is quite normal in appearance; it is not swollen and there are no vesicles upon it.

The *membrana tympani* is also quite normal.

Face.—A small group of imperfectly formed vesicles is situated upon the right molar eminence, and on the lower lip near the right angle of the mouth.

Buccal Cavity.—The edge of the tongue on the right side far back close to the anterior pillar of the fauces is red and swollen, and presents one small roundish erosion—evidently a ruptured vesicle.

Pharynx.—The whole of the right side of the pharynx is red and congested. The left side is normal, and the transition on the posterior wall from inflamed to normal mucosa takes place abruptly at the middle line.

Ruptured vesicles are present on the following regions: The right anterior pillar of the fauces; tonsil; posterior pillar of the fauces; lateral retro-tonsillar pharyngeal wall; and posterior pharyngeal wall. Herpetic spots on the right pharyngeal wall are visible as far down as can be seen with the laryngeal mirror. (The patient was too ill to be examined with the œsophagoscope.)

Ruptured vesicles are also present on the posterior part of the hard palate and on the soft palate, always on the right side.

There are no vesicles on the inner aspect of the *cheeks*, and the *nose* also is normal.

Larynx.—Fresh unruptured vesicles are present on the laryngeal aspect and on the edge of the right side of the epiglottis, on the upper edge of the right ary-epiglottic fold, and on the arytenoid eminence of the right side.

Paralysis.—In addition to the facial paralysis already noted, the right vocal cord was seen to be paralysed. (Observation confirmed by my colleague, Dr. J. Atkinson.) For further developments of the paralysis see below.

The movements of the soft palate were unaffected. There was no paralysis of the orbital muscles, and the pupils were equal and responded to light. There was no paralysis of the tongue and no anaesthesia of the face or tongue.

The *knee-jerks* were diminished; that is to say, the foot did not make any movement when the patellar tendon was tapped and yet the extensor muscles of the thigh could be felt contracting under the hand. This defect I assumed to be due to the general muscular debility.

There has been no vertigo. Slight physiological nystagmus on extreme deviation to either side is present. The patient stands steady on both feet, sways slightly on one, but as he can hop backwards on one foot with eyes closed we conclude that there is no Rombergism. He is too ill for the vestibular tests to be applied. (For further vestibular developments, see later.)

Hearing.—After the meatus of the right ear had been cleared of a plug of cerumen and *debris* the hearing-tests showed the audition in the right ear to be quite normal.

May 30.—While leaning out of bed to drink, the patient was seized with severe vertigo and nausea, and later with vomiting. There was also a subjective movement of objects from left to right which passed off after the patient had vomited. The vertigo gradually subsided, although, on June 4, there was still some remaining when he turned his head quickly.

Condition on June 4.—Still facial paralysis present. The herpetic vesicles on the face and pharynx have disappeared, but a small group of intact vesicles is still visible on the hard palate. The herpes in the fossa of the helix has dried up and the swelling of the auricle has subsided. There is a small ulcer on the meatal edge of the concha. The pain is almost entirely gone.

Larynx.—*The right cord is moving.* It does not come right up to the middle line, but movement outwards on full abduction is plain. The herpes in the larynx has disappeared.

There is some loss of hearing to-day.

Tuning-fork Tests (250 V.D.).—Meatus, — 8 sec. Mastoid, — 8 sec. Rinne *minus*.

Pulse 90; temperature 98° F. Knee-jerks more marked.

Vestibular System.—There is to-day decided spontaneous nystagmus to the left. None to the right. Rombergism *positive*; he falls to the right when standing on one foot.

Further *paralytic phenomena* were discovered to-day. (I have to confess that they were not looked for until to-day.) The right sterno-mastoid is distinctly paretic as compared with the left. The upper fibres of the right trapezius are also paretic as compared with the left.

He finds some difficulty in swallowing solids, having to drink frequently in order "to wash them down."

June 9.—Seen by Dr. Purves Stewart, Hon. Consulting Physician to the Hospital, who confirms the above findings, and, in addition, reports "there is also complete loss of taste in the chorda tympani distribution on the right side of the tongue and blunting of sensation in the herpetic area within the ear when tested with pin-pricks." Dr. Purves Stewart also withdrew some cerebro-spinal fluid, the report on which showed thirty-six lymphocytes per c.mm. and a negative Wassermann reaction.

June 11.—Ever since the lumbar puncture the patient has been confined to bed with headache. He looked so ill to-day (pulse 70; temperature below 95° F. in the mouth) that he was admitted to hospital as an in-patient.

June 15.—Headache gone. Looks better. Discharged from hospital. During his stay in hospital the pulse-rate fluctuated between 60 and 65 per minute, and the temperature was subnormal (in bed).

June 19.—Looks and feels better. The facial paralysis persists.

Caloric test in the right ear produced very slight nystagmus in 25 sec. No vertigo.

July 16.—Facial paralysis still persists.

The disease in this case was unusually widespread, the nerves that traverse the jugular foramen and have their root ganglia in that neighbourhood—the glosso-pharyngeal, vagus, and spinal accessory, namely—being involved as well as the facial.

Ramsay Hunt, in his description and analysis of the recorded

cases, has drawn attention to the occasional involvement of the vagus, but he notes also the fact that in none of the cases in his collection was there any mention of laryngeal paralysis. In these cases extension to the vagus was suspected rather than diagnosed by the pulse being slow and by vomiting. In our case bradycardia was present, but save and except when the vestibular system was attacked there was no vomiting.

It is worthy of remark that in our case, right recurrent paralysis, though complete, was yet quite transitory, lasting at the longest only a few days, and that in the stage of recovery the abductors were much more active than the adductors; there was an appearance of feebleness and of effort in the movement of adduction, whereas abduction was prompt and complete. Subsequently, the movements were entirely regained.

It is conceivable that when herpes affects the vagus ganglion the laryngeal paralysis is always of short duration, and this may be the reason why its presence has not previously been observed.

Another point of interest lies in the fact that we were able to watch the disease developing. The herpetic rash appeared first on the tongue and pharynx on May 24. At this date hoarseness was observed by the patient, so that we may confidently assume that the vagus became involved about this time. Three days later, May 27, the facial paralysis first appeared. On May 27, also, the auricle was swollen and inflamed, and on May 28 fully-formed vesicles were first visible upon it. On May 28, the herpetic vesicles on the larynx were quite recent, so we may argue that the laryngeal paralysis came on before the laryngeal herpes appeared. Finally, the invasion of the vestibular ganglion took place on May 30. The date of involvement of the spinal accessory is uncertain.

Constructing the course of events in the form of a table we get:

May 21: Pain in the ear.

„ 24: Herpes of tongue and pharynx (glosso-pharyngeal).

Laryngeal paralysis (vagus—spinal accessory).

„ 27: Facial paralysis (facial).

„ 27 and 28: Herpes of auricle (facial).

Herpes of larynx (vagus).

„ 30: Vestibular storm (vestibular of auditory).

Thus the evolution of the disease occupied no fewer than eight days.

The result of the examination of the cerebro-spinal fluid—lymphocytosis—is what is usually found in herpes.

In addition to the cranial nerves already mentioned in the literature as liable to attack along with the facial in herpes oticus we are able to add the oculo-motor. In a case reported by Dr. C. O. Hawthorne we find that there was "left ptosis with other signs of third nerve paralysis, left facial paralysis, and some spots of herpes in the area of distribution of the supra-orbital branch of the fifth nerve." Ramsay Hunt cites a case with abducens paralysis.

It is a little difficult, at first sight, to explain how pure motor nerves, such as the spinal accessory, the oculo-motor, and the abducens, become involved in a disease which attacks only, it would seem, posterior root ganglia, unless we assume that as part, or in consequence of the inflammation in the ganglion the neuritis in the nerve-trunks adjoining the affected ganglion may spread to involve other nerves which communicate with the nerve-ganglion and trunks primarily attacked.

The very slight involvement of the cochlear ganglion as compared with the vestibular in the above case is also noteworthy.

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ACUTE ULCERATIVE TONSILLITIS ASSOCIATED WITH VIRULENT PYORRHŒA ALVEOLARIS.

BY ARCHER RYLAND, F.R.C.S.E., LIEUT. R.A.M.C.

PRE. J. C——, aged nineteen. Patient complained of sore throat, of sudden onset, and of five days' duration. On examination, the faucial tonsils presented the following appearances:

Deep ulceration of both tonsillar surfaces. There was excavation of tissue, in three or four separate and distinct areas, on the buccal surface of each tonsil. The ulcerated edges were clear cut, but irregular, and surrounded a greyish sloughing base. The

neighbouring ring of inflammatory areola was only slightly marked. There was no œdema, very little pain, and the fauces, palate, and uvula were free of inflammatory change. The tonsillar lymphatic glands on each side were slightly enlarged.

Examination of the nose revealed an extreme anterior deviation of the cartilaginous septum to the right side. The deviation was probably of traumatic origin. The patient was a mouth-breather.

In addition to the tonsil appearances, there was no other feature in the case to suggest syphilis, which was strongly denied by the patient himself. The Wassermann test was not carried out.

Solution of silver nitrate, 20 per cent., was applied daily to the ulcerated areas, which under this treatment began to improve, and eventually healed over almost completely by the seventh day of treatment. On the sixth or seventh day of treatment, there suddenly appeared an acute, virulent, and rapidly progressing septic invasion of the gums of both upper and lower jaws. The gums rapidly became soft, spongy, and very tender. Pus was seen to be freely exuding from between them and the teeth.

There were marked constitutional symptoms. The temperature rose. There was headache, malaise, the patient was toxæmic, and the decision was almost made to remove freely the infected teeth.

Pure carbolic acid and other remedies were used locally without effect. Eventually under the influence of hydrogen peroxide 10 vols. (per cent.), the infection left the mouth almost as suddenly as it had appeared.

The pyorrhœa lasted for eight days. No mercury or other anti-syphilitic remedies had been given. No bacteriological examination had been made of the initial lesion. A bacteriological examination of the alveolar exudate during the height of the infection revealed the following:

A pure growth of a long-chained streptococcus, of unusually large size as regards the cell-bodies, and Gram +. With methylene blue, there was a very definite bi-polar staining.

As regards tonsillar, and indeed, buccal infections generally, such an organism as the one above described is, in the writer's experience, entirely novel.

The bilateral tonsillar condition seen on first examination and also the subsequent course of the case were of unusual character.

It is to be regretted that no cultural examination was made from the original lesion, but it would appear highly probable that

the same organism was responsible for both the tonsillar and alveolar infections.

A point of interest is the extreme rapidity with which the organism surrendered to hydrogen peroxide.

I am indebted to Lt. A. C. D. Firth, R.A.M.C., who has kindly carried out the bacteriological investigation.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—OTOLOGICAL SECTION.

May 14, 1915.

DR. ALBERT A. GRAY, *President of the Section, in the Chair.*

Mastoid Grafting.—**Dan McKenzie.**—This note merely deals with the mode of retaining the graft. I practise immediate grafting, as Mr. Ballance advises, and there is no doubt that it shortens convalescence. After the graft has been accurately apposed to the walls of the bony cavity, all that need be done to secure its retention is to allow the cavity to fill with blood. The coagulum retains the graft perfectly in position, and packing is therefore unnecessary. In cases where the cavity has had to be re-opened a few days after the operation I have always found, on removing the coagulum, that the graft is comfortably *in situ*. Naturally, one must be careful to make sure that bleeding from the osseous surface *under* the graft is not taking place. In the subsequent dressings the blood-clot is left undisturbed. It begins to disintegrate four or five days after the operation, and when that process is completed the graft will be found to have sown its cells over the surface.

Mr. STUART-LOW asked how the grafting was carried out. If the grafting were done at the time of operation by inverting the skin dissected up from the surroundings of the wound he did not approve of the method, as skin could never be rendered properly aseptic and would therefore endanger the wound. He had known of instances where erysipelas had occurred when this method had been followed. Since he had introduced the blood serum method in his operations (filling the bony cavity with blood serum) he had got better results than by grafting, as the average time that the bony cavity was cicatrised over was one month, and the hearing three months after the operation was much better than after skin-grafting.

Mr. MOLLISON wished to support the practice of Dr. McKenzie of grafting immediately at the operation. He watched Mr. Marriage apply the graft with the suction apparatus, and the apposition of the graft was perfect. Finding the suction apparatus often broke, he (Mr. Mollison) now used gauze, which held the graft in place just as well. If Dr. McKenzie's blood method held the graft well, he would cease his attempt

to put in gauze, as it was a difficult procedure. Undoubtedly a skin-graft put into the cavity facilitated healing afterwards, particularly at the raw cut meatal edges; instead of getting a raw area to heal with granulations at the entrance of the ear, a perfectly healed skin margin was produced in three or four days.

Dr. DUNDAS GRANT asked whether Dr. McKenzie made use of adrenalin, in order to prevent bleeding at the time of applying the graft. And if so, did any reaction take place, as was seen in some other cases? With regard to the warning as to bleeding occurring under the graft, had his observation led him to regard that as important? He thought the pressure exercised by the clot on the graft could not be so complete as that exerted by the gauze plug. He (the speaker) had always resorted to a gauze plug, but he would be glad to dispense with it.

The PRESIDENT said he did not know when Mr. Ballance devised his method of immediate grafting, but Dr. Dench, of New York, told him he used to carry out the method seven or eight years ago. When he (Dr. Gray) was speaking at the International Congress at Buda-Pest, that writer warned him that sometimes the graft did not take, and then it caused trouble, and had to be removed. To his mind also had occurred the question why blood-clot should keep the graft in place better than did gauze packing. The recommendation that bleeding from the osseous surface under the graft should be arrested was a counsel of perfection. Could one stop bleeding from the osseous surface except from clotting in the veins? Adrenalin did not seem to contract blood-vessels in bone.

Dr. H. J. DAVIS said it would be interesting to hear from members whether they were accustomed now to graft or not. He did not do it, though he did not object to it; it was merely that he did not see the object of it unless the bone cavity was so large as obviously to require it.

Dr. KELSON said his impression was that since Mr. Ballance brought out his classic work the practice of grafting had gradually declined; and he agreed with Dr. H. J. Davis that it would be most interesting to ascertain whether otologists as a body now grafted.

Dr. DAN MCKENZIE replied that he of course used the Thiersch graft, not the entire thickness of skin. If members who did not practise skin-grafting were to try it in a few cases, he thought they would become converted to it. It needed some manipulation, but with the suction apparatus it was wonderful how well it could be aspirated into position. Although, theoretically, the chances of sepsis occurring would be increased by putting a graft on a raw surface of bone, before a protective layer of granulations had formed, he did not recall a case of his in which he could attribute subsequent sepsis to the graft. Before he began to graft, suppuration after mastoid operations was as common in his cases as it was now. One could very seldom get a mastoid cavity aseptic; it could not be made aseptic. Mr. West had pointed out that when there was a fistula in the external canal, it was well to keep that free of the graft; and the same held good when there was a pocket of disease; any spot likely to be troublesome should be left bare. He did not use adrenalin in these cases, because of the risk of subsequent reactionary hæmorrhage, which would cause the graft to be floated up. He had not seen one float up, but the possibility of it could not be denied. If the bone surface was fairly dry, there was no obvious bleeding, and the clot which formed on the outer side of the graft prevented any great hæmorrhage taking place beneath afterwards. What Dr. Davis said was true, but the reason the graft did not take sometimes was that the wound had been so septic at first that it had killed the graft. In some cases he had had to take

the graft out, or it had been accidentally removed in the dressing; and in those cases it seemed as if the cells from the graft had already distributed themselves over the surface. So when the membranous graft was removed, there were left a large number of epidermal cells which quickly took root and grew. He could not say what was the average time required for the wound to heal; perhaps the shortest time was about four weeks. There might be occasion to re-open owing to some complication such as lateral sinus trouble, for example.

Congenital Syphilitic Deafness undergoing Thyroid Treatment.

—**J. Dundas Grant.**—The patient, a young woman, aged nineteen, became suddenly deaf when aged nine; there is no recollection of attacks of giddiness. Her eyes had been affected for twelve months previously. The central incisors are deeply notched and slightly pegged. She was first seen by Dr. Grant on November 13, 1914. The loud conversational voice was heard at 2 in. on the right side, and the whispered voice not at all. On the left side there was no hearing whatever. The caloric test showed slightly diminished activity on the right side and considerably diminished activity on the left (*i. e.*, nystagmus produced by cold air on the right side in thirty-five instead of twenty-eight seconds, and on the left in forty-nine seconds). She had had slight snuffles at birth. The first child was a miscarriage; the second, a boy, aged twenty-one, alive and well; the third, the present patient; the fourth, a boy, alive and well; the fifth, stillborn, premature; the sixth, boy, died, aged seven months; the seventh, boy, alive and well; the eighth, girl, alive and well. She was ordered pil. hydrarg. and opium night and morning, and half a 5-gr. thyroid tabloid night and morning. At the end of a fortnight the whispered voice was heard at 4 in., and then she took the thyroid tabloid increased to one whole tablet night and morning. A week later the whispered voice was heard at 4 in. on the right side, and the conversational voice over 5 in. Galton's whistle is not heard below the mark 7. The tuning fork on the mastoid is —3 seconds, and Rinne's test is positive shortened. Tuning fork on the vertex not heard. She did not come for treatment from December 18 until to-day. She is brought forward to-day with a view to estimating the result when she is exhibited on a subsequent occasion.

Hereditary Syphilitic Nerve Deafness undergoing Thyroid Treatment.

—**J. Dundas Grant.**—Mrs. H—, aged twenty-six, first seen on July 17, 1914, complaining of noise and deafness in left ear of three years' duration and giddiness and sickness of six months' duration. The whispered voice was heard at a distance of 20 ft. on the right side and 5 in. on the left side. Rinne's test was positive on the right side, and negative reversed on the left; bone-conduction was normal on the right side and diminished (—3 seconds) on the left. The tuning fork on the vertex was heard loudest in the good ear. Galton's whistle was heard at 1·6 on the right side and 2·2 on the left. There was no narrowing of the left Eustachian tube and no improvement after inflation. The caloric test (cold air) produced nystagmus after twenty seconds on each side (more marked on right). The pointing test was normal. The central incisors are seen to be pegged.

She was first ordered pot. brom., then pot. iod. and pot. brom., but the giddiness still persisted; she then took $\frac{1}{2}$ gr. of quin. sulph. three times a day for a fortnight. The giddiness ceased, and the nystagmus

following the caloric test to the left ear was only produced in thirty-four seconds. The noises still continued; they were found to be slightly diminished by vertebral pressure, and she was again ordered pot. brom.; but the giddiness and sickness returned. She then went back to the quin. sulph., with the result that the giddiness disappeared, but the noises were worse.

She was then ordered 15 minims of liq. hydrarg. perchlor. three times a day for a week, and at the end of that time the head felt clearer and the noises were less. She took this till November 20, when she was ordered thyroid extract tabloids, 5 gr. (half a tabloid to be taken night and morning for a week, and a whole one night and morning for another week), also to continue taking the liq. hydrarg. perchlor. At the end of a fortnight the head felt much clearer and the noises were less.

On December 18 her hearing for the whisper was at a distance of 7 ft. on the left side. She continued with the same treatment till January 8, 1915, when the hearing for the whisper on the left side was at a distance of 16 ft.

On January 8 she was ordered to continue the thyroid tabloids, and to take pot. iod. 3 gr., liq. hydrarg. perchlor. 30 minims, inf. quassia $\frac{1}{2}$ oz., three times a day for a week. At the end of this time the hearing was not quite so good (6 ft. for the whispered voice), and she complained of headache and weakness in the head. She then took simply infusion of quassia for a fortnight, but was not so well at the end of this time.

On January 29 she was ordered thyroid tabloids and liq. hydrarg. perchlor., 15 minims, but at the end of a fortnight the hearing was only at a distance of 6 ft. for the whisper on the left side. She then took the tabloids alone for a week, when the hearing was found to be at a distance of 5 ft. for the whisper; after another fortnight of this same treatment it was 8 ft. She was then ordered mist. pot. brom. in addition to the tabloids for fourteen days, and the hearing improved to 16 ft. for the whisper, while the noises were less.

She has been continuing with this treatment up till the present time. The hearing when tested a week ago was at a distance of 10 ft. for the whisper.

Dr. Dundas Grant added that his object was to show the cases to enable members to judge what the future effect might be. He did not know what was the action of the thyroid, but in Rendle Short's "Newer Physiology" there occurred this passage: "The explanation of the effects of iodides on gummata, arteriosclerosis, and aneurysm is really the increased internal secretion of the thyroid gland." The doses and frequency of administration varied with the tolerance of the individual. He had not given more than a 5 gr. tabloid three times in a day. In one case its use was followed by considerable improvement: the girl also sprang up in stature, and her general condition and strength were altogether better.

The PRESIDENT said that he had not tried thyroid extract in syphilitic cases. One of Dr. Grant's cases was having mercury also. He could not help feeling that the explanation given of the action of the iodide was only partially true, and that its effect on the viscosity of the blood was in part the explanation of its curative value in syphilis. Physiologists often found things that physicians did not. Iodide did not exercise any therapeutic value in tissues the cells of which had no power of multiplication; whereas it would affect syphilitic conditions in which cell multiplication was retained. If the cells of a tissue could not multiply, he did not think anything would put them right when once the nuclei were des-

troved. The method mentioned by Dr. Grant supplied a useful hint for dealing with cases of syphilis which were resistant to treatment.

Dr. DUNDAS GRANT replied that, as the President had said, iodide did not always act; and the reason for that might be that in the particular individual there was not enough of the thyroid gland to react to it. Where iodide did not act, the addition of thyroid extract from without supplied what the person was not producing himself.

Congenitally Deaf Boy improved under Treatment.—Richard Lake.—Mr. Lake said the case had been shown before,¹ and if any member wished to have all the particulars he would supply them.

Aberrant Chorda Tympani.—Richard Lake.—A lady with bilateral aberrant chorda tympani. The nerve passes across on the inner



Aberrant chorda tympani.

aspect of the tympanic membrane from the lower part of the malleus to the periphery of the membrane. Mr. Kelly and the exhibitor have described this condition.

The PRESIDENT said he did not know of any cases of the kind other than those referred to in the notes. He did not know why the chorda tympani should sometimes take the course which it did in these cases.

Mr. LAKE replied that in the previous case he could not find by dissection any trace of the tensor tympani.

Pyrexia after Mastoid Operation for Acute Otitis Media.—N. Turner and R. Lake.—The patient, a young gentleman, a native of San Salvador, of a highly nervous temperament, developed an acute follicular tonsillitis towards the end of April, 1914. At the end of about ten days a large snow-white patch appeared on the anterior aspect of the right tonsil, followed by pain in the right ear extending down the radius of the lower jaw on the same side and causing an intense pain. This was on March 6. This patch was diagnosed as a pneumococcus infection, and treated accordingly.

On March 7 the aural symptoms had increased in severity, and the drum was bulging. It was freely incised under chloroform, giving exit to a free flow of blood-stained serum. The pain and discomfort were relieved, but on March 10 some tenderness was noticed in the mastoid of that side, followed rapidly by redness, tenderness, swelling, and œdema, which had markedly increased by March 11, and there was acute tenderness in the region of the mastoid process on the next day, together with an enlarged gland in the neck.

His temperature had begun to rise, and he was sent into a nursing home on March 12, and the mastoid opened that evening. At the time of the operation his temperature was 102° F. A very small quantity of pus was found in the mastoid, but the whole bone and mastoid process were engorged and the cells filled chiefly with a sero-sanious fluid. A

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxix, pp. 318, 543.

very free operation was performed, and the patient's temperature had fallen by the middle of the next day to 99° F., rising at night to 101° F. He was immediately given calomel 5 gr., and quinine 10 gr., repeated thrice daily.

On March 14 the temperature had gone up to 103·6° F., when the wound was dressed and everything was found looking extremely satisfactory. After dressing, the temperature fell one degree, rising in the early afternoon to 104° F., falling again at night to 101° F. During the next morning the temperature again rose to 103·2° F., falling a degree and a half in the afternoon and rising to 103° F. again at night. He was then given 1 gr. of opium and 5 gr. of calomel. The next day his temperature steadily fell, with a small rise towards the evening of March 16, the rest of the convalescence being uneventful, and he now can hear as well on that side as on the other.

The point of interest, of course, in this case is, what was the cause of his rise of temperature? When seen on the evening of March 15 we were prepared to make a lumbar puncture, but on a careful examination we could see no reason for his not doing quite well, and so no examination was made of his cerebro-spinal fluid. Both of us were quite convinced that we had to deal with a case of threatening meningitis. With regard to these post-operative pyrexias, one often sees cases in which operation on the mastoid is followed by a series of high temperatures; these, as in this case, rising considerably over 104° F., but without any rigors. This rise is accompanied by a marked increase in the pulse-rate and frequency of respiration, though sometimes the pulse-rate is but slightly altered. In these cases one cannot help wondering what would have been the result of a lumbar puncture, and one would feel inclined to advocate and carry out the methodical thecal puncture in all cases in which there was a high pyrexia following mastoid involvement. These cases are so frequent that it seems very doubtful as to what is the proper line to adopt; whether to perform a lumbar puncture, and, if one found the reaction of the fluid neutral and that at the same time it failed to reduce Fehling's solution, then would one in all these cases do a decompression operation, or what would be one's position?

Dr. DAN MCKENZIE said the question the case raised in his mind was as to whether there was not some lateral sinus thrombosis. He believed it was agreed that lateral sinus thrombosis could disappear spontaneously. He could recall the case of a young lady who had a cortical mastoid operation done. It healed up well. Three or four weeks after the operation she developed symptoms of lateral sinus thrombosis, a swinging temperature, and at least one rigor. She was kept under observation; the temperature came down to normal and nothing else happened. Some time after that he read in a foreign journal of similar cases, in which lateral sinus sepsis spontaneously got well. He would like to hear what members thought of the explanation, and whether they had had any similar experiences.

Mr. E. D. DAVIS said that a nurse at Charing Cross Hospital had a mastoid operation done. On the second or third day she had a temperature of 103° F., and it continued three or four days. At the operation the lateral sinus was exposed and regarded as normal; but when the temperature had been running about five days the sinus was compressed by a gauze plug, and after that the temperature came down and remained normal. The plug was placed under the bone in the lowest part of the sinus groove. The sinus was never opened.

Mr. MOLLISON said he saw no reason for invoking lateral sinus

infection in these cases; it seemed to be simply a matter of infection *versus* resistance. He had seen cases of high temperature with very little to account for it; in some cases one could find nothing wrong, except a little catarrh in the middle ear. Since Christmas last he had seen a case similar to that shown by Mr. Lake. A young soldier had acute otitis media on both sides, the whole illness having started with a very high temperature, alarming vomiting, and headache. Both membranes were ruptured, but still the temperature remained very high. He opened one mastoid, and found extensive suppuration. As the temperature still persisted he opened the other; in this, too, there was similar extensive suppuration; still the temperature did not drop. He exposed both lateral sinuses and found them healthy. Infection proved to be pure streptococcus. The patient eventually responded to vaccines and the temperature dropped.

Dr. H. J. DAVIS said that rigors were the chief indication of sinus disease. As a matter of fact, it seemed very difficult to infect the lateral sinus. Even in cases where the sinus was bathed in pus and covered with granulations thrombosis rarely occurred. This was, he supposed, due to the enormous blood-stream and the rapidity with which infection was carried away from the seat of the trouble.

Mr. WHALE said he recently had a case which seemed to have been of the same nature as those mentioned by Mr. Mollison and Mr. E. D. Davis. The mastoid had been, elsewhere, explored on account of disease, and on the tenth day, while the patient was convalescing, the temperature suddenly rose and remained up. On four successive days it was 104° F., on the fifth day 103° F., and next day 105° F. He therefore exposed the sinus down to the bulb, but found nothing, but when the child was put back to bed the temperature fell as suddenly as it had risen. The patient had remained well since. A physician had failed to find anything wrong in the chest or abdomen.

Dr. DUNDAS GRANT asked whether there was any headache in this case: in his own cases of meningitis the headache was severe. The temperature in the cases mentioned seemed to have been more or less continuously high; there were not the extreme oscillations characteristic of infection of the lateral sinus. The note said: "On careful examination we could see no reason for his not doing quite well." With a skilled clinician like Mr. Lake that meant much, and yet it seemed to need some courage to abstain from opening, and possibly exploring, the lateral sinus in this case.

Operation for Ménière's Symptoms.¹—W. H. Kelson.—Patient was a painter, and had been totally unable to follow his occupation owing to giddiness of aural origin. The operation of uncapping the external semicircular canal on the right (deaf) side was performed, and when shown at the Section he was free from giddiness. During the discussion, the question as to the probable permanency of the benefit was raised. In order to clear up this point the operator had made inquiry, and the patient, who lives at a distance from town, writes: "It is now over a year since my operation and I am able to be back to my work. I have not seen my doctor for several months. I am also feeling very much better in myself, and my friends think I am a marvel."

Mr. E. D. DAVIS asked whether this patient was neurotic, and whether

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxix, p. 318.

Dr. Kelson considered that uncapping the semicircular canal had cured the case.

The PRESIDENT asked whether there was any lead-poisoning associated with the case, and whether the giddiness was of long duration.

Dr. DAN MCKENZIE asked whether the vestibular system had been tested since the operation. Some years ago he noticed when a mastoid operation was done in a case in which there was a labyrinth fistula, that frequently when tested five or six months after the operation the vestibular system was found to be altogether in abeyance. If that were so, then in this case it would account for the vertigo having passed away.

Dr. KELSON replied that the patient had not been able to follow his occupation as house painter for over two years. The man was very much better after the operation than he expected to find him. The doctor sent him up with the statement that he could not do anything for him, and that he could not earn his living. Mr. Jenkins had done the same operation in a case with considerable success. He did not consider the man was shamming, as he seemed so anxious to work. He was now again at work.

Acute Purulent Meningitis; Drainage of the Meninges; Recovery.—Dan McKenzie.—The patient, a male, aged fifty, was operated on for chronic suppuration in the left ear on September, 1914. A mastoid operation was performed, the "bridge" being left, and the patient left hospital convalescing.

After attending as an out-patient for some weeks he was readmitted on October 7, 1914, with a re-infection of the partially healed left ear. At the same time the right ear became the seat of acute purulent disease, with pain and discharge.

After simple treatment had been tried, on October 22, his temperature being sub-febrile, the radical mastoid operation was completed in the left ear, and at the same *séance* the same operation was performed on the right ear. On this side there was pus under pressure in a deep mastoid cell, and here an eroded bony sequestrum, 1 cm. in diameter, was found and removed. Next day (October 23) the patient was complaining of headache, and the temperature was running between 100° F. and 102° F. October 24: Spontaneous nystagmus to the left. Some of the stitches in both of the wounds were removed to relieve tension, as they were inflamed and angry-looking. October 25: Vertigo and diplopia complained of. Patient rather talkative and "strange." Severe headache on the right side of the head radiating down to the neck. Very deaf, hears a shout only. Temperature rose to 103·8° F. October 28: Spontaneous nystagmus II to the left. Some rigidity of the neck and tremor of the head on flexing the head on the chest. No diplopia; no dysdiadokokinesis; Babinski's sign negative. Hears the tuning-fork by bone conduction in either ear with the noise machine. Complains of severe headache, and is excitable. No paralyses, but some intentional tremor of limbs present. Lumbar puncture: 20 c.cm. of turbid fluid withdrawn.

Subsequent examination of the cerebro-spinal fluid by Dr. Wyatt Wingrave: Specific gravity 1008, sugar absent, proteids present; leucocytes numerous; lymphocytes, a few; endothelium; bacteria, numerous—cocci and Gram-negative bacilli. Culture streptococci.

Operation: The headache being right-sided was the only indication as to the peccant ear. The right mastoid was therefore reopened, and the posterior wall of the mastoid process removed to expose the lateral sinus and the dura medial to it. The vessel was opened, inspected, and

found to be healthy. Double vestibulotomy was performed and the modiolus broken through to reach the internal auditory meatus, into which a wire drain was inserted. A transverse incision was made extending from close to the internal auditory meatus to the lateral sinus in the dura of the posterior fossa, and from the internal end of this incision a free flow of cerebro-spinal fluid welled up. The wound was packed with dry gauze and left open.

October 28: Right facial paralysis. Spontaneous nystagmus to the left still persists. Patient very restless, and complaining of severe headache. October 30: Pulse markedly intermittent, and patient very deaf and stupid. He is still restless and complaining of severe occipital pain. The appetite is good. The wound is draining cerebro-spinal fluid very freely, the dressings being always soaked.

Temperature showed a gradual decline from 103° F. on October 28 to 99° F. to 100° F. on November 1. Thereafter for a couple of weeks it ran about 99° F., and on November 18 fell to normal for good.

November 1: Mentally clearer. Still headache, but less severe. Cerebrospinal fluid still draining. November 4: Wire drain removed from internal auditory meatus.

In this case the translabyrinthine flow of cerebrospinal fluid was disappointingly slight. From the dural incision, on the other hand, the drainage was very free, continuing in gradually lessening quantities for about ten days. The symptoms declined in severity *pari passu* with the fall in the temperature. He is unable to remember anything of his illness during the week subsequent to the operation.

Mr. WHALE referred to the last paragraph of the notes, "the translabyrinthine flow of cerebrospinal fluid was disappointingly slight," and asked whether the exhibitor did not consider that the cure in his case was due simply to cutting the dura, and that inserting a wire drain in the internal meatus did not help. He had had only one case of the kind, and that patient died; and he found *post mortem* that nothing was draining through the silver-wire drain; it was found to be quite choked.

Dr. DUNDAS GRANT said Dr. McKenzie, in this case, had carried out a treatment which was advocated as the most beneficial at a meeting of the German Otological Society, in the discussion as to the curability of otitic purulent meningitis. It was considered that the best results followed incision of the dura mater, and the exhibitor's result seemed to have confirmed the view arrived at there.

Dr. MCKENZIE, in reply, said that since the practice of draining the meninges had been started, there had been a larger percentage of recoveries, and that in itself justified the practice. He concluded that in this case the dural incision was sufficient. There was no lateral sinus disease. He destroyed the labyrinth to drain the meninges. He had combined the two methods, believing that if the operator could open two doors instead of one it was the right thing so to do.

Microscopic Specimen of Cells from Cerebrospinal Fluid, showing Organisms.—W. M. Mollison.—The patient, a child, aged six, was admitted to Guy's Hospital on account of drowsiness and a raised temperature, 101° F. There was a history of some discharge from the right ear, but there was almost none on admission. Lumbar puncture showed the fluid to be under increased pressure and cloudy. Apart from this sign of meningitis the patient exhibited no localising signs at all; she was drowsy, had a fluctuating temperature, and a pulse-rate corresponding to the temperature. Examination of the ear showed slight

moisture on a disorganised membrane; this was not foul. Operation disclosed cholesteatoma in the antrum and a small temporo-sphenoidal abscess above the tegmen antri. The pus was very foul. Lumbar punctures were repeated each day for four days, but though the pressure was raised the fluid was not cloudy, and in a week it had become normal.

Herpes Auris.¹—**W. M. Mollison.**—**CASE 1**—Man, aged eighteen, attended Guy's Hospital on account of a right-sided facial paralysis. Ten days previously he had a blow on the head in the left parietal region. Following this he was in bed for four days with headache and sickness. The day after the blow he noticed facial paralysis. A few days later some spots appeared on the auricle; he had no pain in the ear, no deafness, no vertigo. The patient had a complete right-sided facial paralysis, and on the right auricle were scars of what had been herpetic spots; these scars occupied the concha and reached up along a line through the crus of the helix to the outer and upper edge of the auricle.

CASE 2.—The following case is a contrast to the foregoing: A soldier, aged twenty-one, was seen at a Red Cross hospital with a view to operation for acute mastoiditis. Eight days previously he had noticed a lump in the neck, had earache and was deaf in the right ear; some spots appeared on the auricle. He was three days in Chatham Hospital, and was then transferred to the Red Cross hospital. He then was complaining of acute pain in the right ear, and had marked tenderness over the mastoid process. The pain was so bad as to keep him awake, and was not relieved by doses of aspirin. These symptoms and signs, together with a swelling below the tip of the mastoid and a temperature of 100° F., suggested acute mastoiditis. On examination, the right auricle presented a number of red scars on the external aspect, again fairly obviously the remains of herpetic spots; there was an enlarged gland below the tip of the mastoid. The tympanic membrane was normal, but the patient was very deaf (? totally so). The mastoid process was very tender, but this tenderness was more superficial than deep, more of the nature of a hyperæsthesia. Aspirin and small doses of quinine were prescribed. Three days later the patient was much better, but an additional interesting feature developed; he had, while walking in the garden, an attack of vertigo which caused him to fall.

The **PRESIDENT** asked whether the facial palsy had disappeared in the second case; also whether the deafness had persisted. What would be the cause of deafness in a case of herpes? Herpes associated with disease of the geniculate ganglion was not usually accompanied by dulness of hearing. Conceivably there might be some inflammatory exudate affecting both the geniculate ganglion and the cochlear branch of the auditory nerve, travelling back and infecting the cochlea.

Mr. RICHARD LAKE said that years ago he showed a series of cases of herpes, and in all the membrane was affected; only one had herpetic spots besides. There were no spots on the membrane in these cases.

Mr. MOLLISON, in reply, said that when he first saw this case of herpes there was complete paralysis on the right side and the herpetic spots had almost disappeared, though there were still scars. He had seen four cases of herpes on the auricle and none had spots on the membrane. Some of them had facial paralysis, others had not. One of these present cases had it and the other had not. The interest of these two cases was that they were completely different; in one case there was facial paralysis, herpes,

¹ See also pp. 339, 375.

and no deafness; in the other case herpes, no facial paralysis, but great deafness. Ramsay Hunt spoke of deafness and vertigo as a characteristic feature of some of these cases of herpes due to implication of other ganglia as well as the geniculate. He could not be sure as to the totality of this man's deafness, as he examined him at Westcliff, where he had not proper means of testing. In the case of the second patient, the doctor telephoned to say he was certain the mastoid must be opened, because of the swelling below the mastoid, the pain and the tenderness.

Primary Acute Mastoiditis (so-called).—W. M. Mollison.—T. P.—, aged four, attended Guy's Hospital on April 20 on account of a swelling over the right mastoid process; the swelling was said to have been present four days. The child's mother said the right ear had ached ten days ago, but there had been no discharge. The right auricle was displaced downwards and forwards, and over the mastoid process was a red, fluctuating swelling, scarcely tender; the tympanic membrane was normal. Operation was performed and pus found in the mastoid process, and sticky pus in the antrum. Cultivation showed pure growth of pneumococcus.

Mr. STUART-LOW said that during the last winter he had seen a number of these cases in which the middle ear and tympanic membrane were normal and the mastoid had become rapidly affected. In his opinion they were all secondary to throat implication and were influenzal in nature. Dr. Wyatt Wingrave had proved this by finding the influenza bacillus.

Mr. E. D. DAVIS asked whether Pfeiffer's bacillus was actually found in the cases spoken of by Mr. Stuart-Low, as a pneumococcal infection was often mistaken for an influenzal. Dr. Emery had said that there might be three organisms present in supposed clinical influenzal cases: Pfeiffer's bacillus, the *Micrococcus catarrhalis*, and the pneumococcus, or either of them, but that the bacillus of influenza was rarely found in these cases.

Dr. DUNDAS GRANT said it was agreed that even in cases diagnosed by competent people as influenzal it was rare to find Pfeiffer's bacillus; the bacteriology was mixed. He asked whether these anomalous ear and mastoid cases were not almost confined to children. There was something special in the pathology of the child's ear. The antrum was comparatively large, as compared with the tympanum, and disease in the tympanum would settle down while it remained focused in the antrum. Tuberculosis would appear as a localised infection of the surface of the mastoid while the middle ear might be almost untouched.

Mr. NORMAN PATTERSON said that in one case on which he had been called to operate, and where the temperature was 104° F., the right ear appeared to be the culprit. He opened up the right mastoid and found some pus in the cells and antrum; the sinus was exposed and found to be normal. This was in the evening. The next morning the temperature had dropped to normal. But in the evening the house-surgeon notified him that the patient had had a rigor. On again examining the left ear he could find nothing indicating disease. He, however, opened up the left mastoid, but beyond congestion discovered nothing. He thought it advisable to explore the posterior fossa, and on doing so found an extradural abscess and a thrombosed sinus. He could only suppose that the infection of the tympanum and antrum had taken place, but had cleared up owing to the possibility of drainage. On the other hand, infection having once reached the interior of the skull, and pus having once formed,

the pus then became pent up. Drainage could not take place from this region.

Radical Mastoid Operation performed by Disease.—W. W. Mollison.—W. H.—, aged fourteen, was brought to Guy's Hospital in January, 1915. He had had left facial paralysis since he was four years old, caused perhaps by some incisions in the neck which were made when the boy was that age. There had been left otorrhœa for about the same time. The left ear shows a "radical" cavity, and there is no scar over the mastoid process.

Dr. DUNDAS GRANT said such cases had been shown before the Section, and he had described cases of cholesteatoma in which he found a homogeneous lining membrane in the cholesteatoma, which he thought well to leave *in situ*. He thought he had caught those cases just at the stage when suppuration was going to perform a radical operation on its own account. He had not seen such cases recently, possibly because they were not allowed to go on so long.

Operation for Epithelioma of the Auricle with Secondary Involvement of Glands, May, 1912 (Three Years ago); no Recurrence. Specimen shown.—Norman Patterson.—Patient, a male, aged sixty-one, had a small growth on the pinna with well-marked enlargement of the cervical glands. There was a large hard mass over the upper part of the jugular vein, underneath the sternomastoid.

The operation consisted in removal of the auricle, together with a very free dissection of the neck. The internal jugular and also portions of the sternomastoid muscle and parotid gland were removed. Glands, fascia, etc., were taken away in one mass. In order to avoid trouble with the internal jugular in the upper part of its course, the lateral sinus was exposed early in the operation and a tampon of gauze placed between it and the skull wall, so as to cut off nearly all the blood entering from above.

(A full account of this case appears in the *Lancet*, April 5, 1913.)

Dr. H. J. DAVIS said that he had exhibited an old man with epithelioma of the helix, and the case was published, with photographs, in the *Proceedings* in 1913.¹ He had removed the auricle completely, and it was now in the College of Surgeons' Museum. He did nothing to the glands as none were visibly enlarged. There had been no recurrence. The patient, a gardener, was sensitive about his deformity until an artificial ear was made for him, which answered admirably.

The PRESIDENT said that usually in epithelioma of the auricle the glands were enlarged only late in the disease; it was one of the most favourable forms of epithelioma to deal with if seen fairly early.

Mr. PATTERSON replied that there was no doubt about the glandular enlargement in this case; it was very marked. But the primary growth was a comparatively small one.

Tympanic Membrane moving with Respiration.—Dan McKenzie.—The patient was a woman, aged about twenty-five. The affected membrane was thin and atrophied. Movement on respiration was clearly visible. The condition had been accidentally discovered.

Dr. GRANT thought there must be some obstruction of the nose. When the patient inspired, there was more suction in the Eustachian tube than there would be if air passed freely through the nose.

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxviii, p. 533.

Mr. STUART-LOW said that he had met with two well-marked cases of this condition in one month at his hospital clinic, and had shown them years ago at the British Laryngological Society. In his cases the Eustachian tube on the affected side was very patent, and the tympanic membrane very thin and atrophic, and the hearing was considerably impaired.

Epithelioma of Auricle treated by Diathermy.—Dan McKenzie.

—Male, aged seventy-one. Epithelioma of auricle of two years' duration. (Microscopic examination by Dr. Wyatt Wingrave.) The growth involved a large surface of the auricle and had led to destruction of about one third of the pinna. It had also extended to involve the mastoid region. No enlarged glands could be felt. There was severe pain.

Six weeks ago under chloroform the growth was treated by diathermy. The result had, so far, been satisfactory. The diseased tissue was apparently all removed and the ulcer which had formed was rapidly contracting and healing.

There had been no pain since the operation.

Mr. STUART-LOW congratulated Dr. McKenzie on the seemingly good result in this case, but, of course, it was yet too soon to think that no recurrence would take place. He asked if the epithelioma was in an early stage and if there had been any enlarged glands and how they were treated. Mr. Stuart-Low said that he had originated the method of diathermy puncture of malignant glands and had shown cases at the Laryngological Society greatly benefited by it, and this method would be applicable to such cases as that now shown by Dr. McKenzie if enlarged indurated glands were present.

Dr. KELSON asked whether diathermy was not really cauterisation, and whether it possessed any definite advantages over Paquelin's cautery, excepting that it could be done deeply without necessarily damaging the surface to which it is applied.

Dr. DAN MCKENZIE replied that the ordinary cautery was applied to the surface of mucous membrane or an ulcer. The cautery itself was hot, and charred the surface in contact, and the carbon formed there acted as a non-conductor of heat. Consequently the heat could not penetrate beneath the burned surface. But in diathermy the terminal did not get hot; it was the tissue that became hot over a certain surrounding zone. A broad terminal was placed in contact with the chest or back, and over that broad field the heat waves were scattered, but they concentrated themselves upon the operated part where a punctate terminal was applied. Here a charred zone was produced, and beyond that, coagulation necrosis. In healing, the charred zone gave way first, then the coagulation necrosis slowly disappeared; this latter acted protectively against bacterial invasion. Cancer was not a surface condition, but an infiltrating disease; and if the therapeutic agent could be got to infiltrate along the same lines as the diseased cells were progressing, there was likely to be a better result than that obtained by simply charring the surface with the ordinary cautery.

THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL, AND OTOLOGICAL SOCIETY.

May, 1914.

SYMPOSIUM: STENOSIS OF ŒSOPHAGUS.

(A) **Anatomy, Anomalies, Instruments, and Technique.**—**Harris P. Mosher.**—After discussing briefly the comparative anatomy of the œsophagus, the essayist considered the œsophagus in man under the following subheads: (1) Congenital anomalies; anatomy; structure; lymphatics; position; direction; diameter; length; distensibility; sub-phrenic portion; movements; appearance of normal œsophagus. (2) Physiology; function; peristaltic action; respiratory movements; innervation.

He then discussed the contra-indications to œsophagoscopy. The only contra-indications to the performance of œsophagoscopy are acute inflammation, as after the swallowing of corrosive fluids, and aneurysm of the aorta. The chief danger in passing the œsophagoscope is rupture of the œsophagus, which almost always results in infection of the posterior mediastinum and death. Such an accident can be easily avoided by the selection of a tube of the proper size and by adhering to the fundamental axiom of all œsophageal examinations, namely, the examining tube must never be advanced unless the eye sees through the tube the open œsophagus ahead. It should be remembered also that in old people the œsophageal wall may be thin enough to rupture itself, so that smaller tubes and greater care in using them are necessary. It has transpired of late years that there is considerable shock from manipulations carried out in the œsophagus, more shock than is caused by working in the trachea and bronchi. Children bear œsophageal examinations less well than do adults. In poorly nourished patients, particularly those who are on the point of starvation from the presence of a stricture, it is better practice to open the stomach and feed the patient through a gastric fistula until his resistance has been restored, before attempting any prolonged examination.

The œsophagus may be examined under local or general anæsthesia, the author being strongly prejudiced in favour of general anæsthesia, doing most of his œsophageal work with ether.

The laryngologist, on beginning œsophageal work, should supply himself with a full set of general and special instruments, a full list of which is recommended in the paper.

A general physical examination of the patient should be made before œsophagostomy is attempted. An X-ray plate is indispensable before many examinations. It shows the location of metallic foreign bodies, pieces of bone, and buttons; it shows enlargements of the arch of the aorta and enlargement of the mediastinal glands, and, combined with the ingestion of bismuth, it shows the position of strictures, the size and location of diverticula, and the size of the dilated œsophagus.

The technique of œsophagoscopy under local and under general anæsthesia, is described in detail.

(B) **Causes, Symptoms, Pathology, Diagnosis, and Treatment.**—**Chevalier Jackson.**—Stenosis of the œsophagus may be classified as inflammatory, neoplastic, compressive, spastic, and angeioneurotic.

The inflammatory stenoses may be œdematous or cicatricial; the neoplastic, benign or malignant. The compressive may be due to malignant, benign or inflammatory, or peri-œsophageal lesions, or to aneurysm or enlargement of the left auricle. Compression stenosis is also frequently caused by a pulsion diverticulum of the œsophagus itself when the pouch is full of food. Spastic stenoses are usually seen at the cricoid level, due to spasmodic contraction of the inferior constrictors, especially the orbicular fibres, along with the adjacent orbicular fibres of the œsophageal wall. The next most frequent spastic stenosis is at the diaphragmatic hiatus, the contraction being due to the traction of the diaphragmatic musculature and the small bundles of fibres given off from the diaphragm and attached to the œsophagus. Angeioneurotic œdema producing severe stenosis of the œsophagus has been observed by Arrowsmith.

The ætiology varies with the character of the stenosis. Inflammatory stenoses are most frequently caused by swallowing corrosives, but they may be due to stasis of food held up by spasmodic stenosis. Other causes are the traumata of foreign bodies, the mixed infections associated with lues and with tuberculosis of the œsophageal wall.

The cause of neoplastic stenoses, like that of neoplasms elsewhere, is unknown. Inflammatory processes and their end-results probably contribute to the ætiology by affording a favourable soil.

Spastic stenosis may be local or general. Local stenosis is often the result of a "vicious circle" started by rapid eating, with its associated gulping of large boluses of badly-masticated food, followed by stasis of the food, inflammation, and erosion, which, in turn, serve as a source of reflex excitement of more frequent and prolonged spasm, this inflammatory process being thus increased. The general causes of spastic stenosis are dependent upon some basis of nerve disorder, probably more functional than organic.

Pulsion diverticulum, as demonstrated by Killian, is chiefly caused by insufficient support of the œsophageal wall between the fundiform and oblique fibres of the inferior constrictor of the pharynx.

Extensive consideration of the symptomatology is useless, inasmuch as any abnormal sensation whatever, referable to the œsophagus, is an indication for œsophagoscopy, by which, rather than by symptoms, the diagnosis is to be made. An otherwise altogether unaccountable cough, "globus hystericus," and the filling to overflowing of the pyriform sinuses with secretions, are some of the signs which may lead to the diagnosis of œsophageal stenosis.

Radiography is of the greatest use in demonstrating the size and extent of dilatation and diverticula, as well as in assisting in making the diagnosis of their presence. Fluoroscopy affords very important aid by determining the functional activity of the œsophagus during the act of swallowing. Taken alone, however, these means may lead to error.

The bougie, passed blindly, is of no use for diagnostic purposes. The differential diagnosis of lues, tuberculosis, and malignancy is made by exclusion and by biopsy. The other types of stenosis are diagnosed by characteristic signs, which are detailed by the author.

Treatment should never be instituted while the patient is in the condition of water starvation. Enteroclysis or hypodermoclysis should be begun immediately. Immediate gastrostomy by the general surgeon, preferably under local anæsthesia, should be performed when the patient has had little or no water for as much as four days.

œdematous inflammatory stenoses are best treated by the swallowing

by the patient of small doses of bismuth with a little calomel, both given dry on the tongue.

Cicatricial stenoses, in the author's experience, are best treated by filiform silk woven bougies passed cesophageally.

Benign and endo-cesophageal growths are probably readily removable, though they are so rare that accurate data are lacking.

Malignant stenoses of the cesophagus are regarded by general surgeons as inoperable. There is reason to hope, however, that, when early diagnosis is possible, transthoracic cesophageal resection may be a justifiable procedure.

Spasmodic stenoses are best treated by divulsion. For this the author prefers a mechanical divulsor, such as that of Mosher, placed by sight through the cesophagoscope.

The treatment of compressive stenoses obviously depends upon the nature of the compressive mass.

Pulsion diverticula, according to the consensus of opinion, steadily increase in size and severity of symptoms; consequently amputation of the sac by the surgeon, operating through the neck, is indicated. The operation with cesophagoscopic aid, devised by Dr. Otto C. Gaub, has been successfully employed by the author in two cases. This method is described and illustrated with three figures.

Dr. ROSS HALL SKILLERN recommended the suspension laryngoscope, which, with the suspension apparatus, gives a technique as simple as the passing of a naso-pharyngoscope into the nose. With the tongue depressor and the apparatus for lifting up the larynx the pyriform sinuses and the upper part of the larynx could be shown completely, without lifting the cricoid cartilage entirely. The instrument was fitted with a double light. The tube was passed, as one would pass the naso-pharyngoscope, and slipped down below the cricoid cartilage. By comparing this with the other method he had found it the simpler. He could see directly into the larynx. Children, as a rule, stood the cesophagoscope badly, but under the suspension apparatus they would stand for hours, or as long as necessary. He had had no child, thus far, to "go bad" with the suspension apparatus in position.

Dr. SIDNEY YANKAUER recounted an experience with a stricture at the cardiac end of the stomach. The patient had suffered for many years from cardiospasm, and many attempts had been made to dilate the cardia, all without the slightest effect upon the cardiospasm. The man was unable to swallow other than liquid food, most of which came back into the mouth. He finally came into the hands of Dr. Willy Meyer, who, in the differential pressure chamber, opened the thorax, found the dilated portion of the cesophagus, which he corrected by plicating, but without improvement. The patient was put in the chamber again and an operation similar to Mikuliez's pyloroplasty performed on the cardia through the chest wall. There resulted not the slightest improvement in the swallowing or the cardiospasm. Dr. Meyer then turned the patient over to him to see what could be accomplished with the cesophagoscope. Upon putting in the instrument the scar-tissue from the plications could be seen forming ridges at the antero-lateral portion of the cardia; beyond this a bend of the lumen was located at the cardia, which it was impossible to pass. The lumen of the cardia was merely a slit. Attempts to pass through this brought so much pressure to bear upon the sides of the cesophagus that it was impossible to proceed. To pass and straighten out this tissue was a problem. He made for the purpose a wire probe which consisted of small joints, about a quarter of an inch long, so con-

structed that it would bend in one direction but could not return beyond a straight line. His idea was to use the curved part to go round the ridge to rotate the instrument and then to pass the straight part into the stomach. After several attempts he finally succeeded in straightening out the ridge and in passing a narrow tube beyond the ridge. He then saw what seemed to be a string coming out from the lumen of the cardia. It proved to be a silk suture from the cardioplastic operation. Subsequently he found another stitch which he cut and removed. Following the removal of these two stitches the scar tissue softened up considerably, after which the gastroscope could be passed. After this the patient could swallow liquid food without difficulty, and some semi-solid food. He then passed the gastroscope and manipulated the head and shoulders in an effort to loosen up the cicatricial tissue. The patient's condition improved to such an extent that he could swallow gruels and semi-solid foods, but not solid food. The case illustrated what could be accomplished by the exercise of patience and a certain amount of resourcefulness.

DR. SAMUEL IGLAUER described a procedure employed in the treatment of a case of complete obstruction of the œsophagus following typhoid fever occurring in a boy about ten years of age. A gastrostomy had been performed, through which the patient had been fed for a number of years. In order to measure the thickness of the obstruction an olive-tipped bougie was passed from the stomach into the œsophagus and another was passed through the mouth, and the distance between the two olives was determined by an X-ray picture. The olives were found to be slightly overlapped and about one-sixteenth of an inch apart. (Esophagoscopy both from the oral and the stomach end of the œsophagus failed to reveal any fistulous tract through the obstruction. A few days later, working in conjunction with Dr. Murphy, of Cincinnati, an attempt was made to relieve the obstruction by an original method. An œsophagoscope was introduced through the stomach end of the œsophagus and at the same time a second œsophagoscope was introduced through the oral end. Both tubes were introduced as far as the obstruction, there being an observer for each instrument. When the light in one instrument was turned out the glow of the light in the other could at times be seen transilluminating the obstruction. With an electro-cautery an attempt was then made to burn through the transilluminated diaphragm from above. The cautery was followed by a slender bougie which apparently passed through, but digital examination showed the bougie under the mucous membrane in the stomach. The bougie had evidently dissected up the mucosa of the œsophagus and passed down into the stomach wall. After a few days the patient was removed from the hospital contrary to advice. While on the train on his way home he began to swallow naturally, and this continued up to the time of his death, which occurred about three weeks after the operation. Evidently the lumen of the œsophagus had been restored, and if the procedure outlined above had been followed more cautiously it would have proved more successful.

DR. GEORGE F. COTT added a third condition to the two mentioned by Dr. Mosher, in which the œsophagoscope could not or should not be passed. He cited a case in which the patient could not swallow, and in whom, under ether, the œsophagoscope could not be passed, after strenuous efforts for some time. Upon further investigation it was discovered that there was ankylosis of the cervical vertebræ from syphilis.

DR. G. HUDSON MAKUEN asked if Coley's fluid (mixed toxins of *Bacillus prodigiosus* and *Streptococcus erysipelatosus*) had been tried in malignant disease of the œsophagus. Many cases of marvellous cure

have been reported not only by Coley himself but by other distinguished surgeons in this country and abroad, and it would seem that, unless there were some contra-indication against its use, it might prove to be quite as efficient, if not more so, as any of the other methods which have been suggested, not excluding radium. He had recently been talking with Dr. Coley about the preparation of the fluid and about its use—a work in which he has been engaged for more than twenty years—and he was encouraged to hope that it might be useful in the class of cases under discussion. He would be glad to hear opinions on the subject.

Dr. ROBERT LEVY said the sign of which Dr. Jackson had spoken—the accumulation of secretion in the pyriform sinus—had been observed by him in cases of tuberculosis with painful deglutition. He had seen cases in which these sinuses were completely filled.

Dr. R. H. CRAIG (Montreal) suggested the use of the high frequency fulguration spark in the treatment of inoperable cases of this nature. He cited a case in which the pain absolutely disappeared, and the growth was greatly reduced. The patient, however, died six months later. In another case of malignant disease, involving the sphenoid and the nasopharynx, after a month's treatment the growth was much reduced in size. He believed the high frequency fulguration spark is of great value in alleviating pain and diminishing the growth in these desperate cases. Where the growth was accessible carbon dioxide snow might be useful.

Dr. JOSEPH C. BECK asked Dr. Jackson if he had employed the Abderhalden test for carcinoma. He also asked Dr. Jackson to specify, in closing the discussion, what he meant by "small quantities" of radium. He had employed 19 milligrams of the salt or 10 milligrams of the pure radium element.

Dr. MOSHER, in reply, said Dr. Skillern's remarks interested him. He had tried the procedure of suspension œsophagoscopy, and had found it satisfactory in the examination of the upper part of the œsophagus. He had not had the trouble with the breathing which Dr. Skillern mentioned; in fact, he had been astonished to see how little trouble he had had in this regard. Referring to Dr. Iglaue's case he said he had reported a case three or four years ago where the same procedure was used. It was a case of absolute stenosis of the œsophagus, and he attacked it from above and below. The procedure which helped was that of picking the stricture apart, ballooning, and picking it apart again. In his experience perforating the œsophagus led to fatal mediastinitis.

Dr. JACKSON, in reply, said Dr. Mosher was the highest authority on the anatomy of the œsophagus. Dr. Jackson believed that all the early œsophagoscopists and many to-day mistook the hiatal constriction for the cardia. The question of anæsthesia was a matter of the personal equation. Every man should select the instruments which suit his needs best, and so it is with anæsthesia. The method should be selected which suits the operator's needs in the particular case. Personally the speaker had been very much interested in the case reported by Dr. Yankauer. He thought the work of Dr. Yankauer and Dr. Meyer would open a new field. The procedure mentioned by Dr. Iglaue was exceedingly interesting, and while it was a failure in the case cited it was justifiable in absolutely impervious strictures, and offered hope of success. In co-operating with Dr. Brennehan he had passed a tube to serve as a staff upon which Dr. Brennehan cut the occluding cicatrix from below through the externally opened stomach. Such procedures were, of course, indicated only in impermeable occlusion. If any lumen existed, however small, it could be cured by the safer endoscopic methods. Dr. Cott's

point was well taken. Answering Dr. Goldstein's question concerning recurrence of spasmodic stenosis the speaker cited a case of spasmodic stenosis in which he absolutely failed. He stretched the abdominal oesophagus so completely that he could see into the stomach, and yet recurrence took place. This was, however, his only failure so far. The patient became discouraged and finally gave up treatment. Referring to Dr. Makuen's remarks concerning Coley's fluid, he said the method was applicable to sarcoma, and that it was in this disease that radium also gave best results, carcinoma being less amenable. Both methods could be used in the same patient. He suggested that in the cases of filling of the pyriform sinuses by secretions, mentioned by Dr. Levy, there might possibly be spasm in the crico-pharyngeal muscle causing temporary stenosis with resultant filling of the pyriform sinuses, or, in other instances, a disinclination to swallow because of the odyphagia which might exist. Or, in still other instances, an actual organic oesophageal stenosis due to tuberculous infiltration of the "party wall" might be present. Dr. Jackson hoped that fulguration and carbonic dioxide snow would be thoroughly tried, but he had had no experience with either. He had not employed the Abderhalden test, as suggested by Dr. Beck, but all diagnostic methods should be used. With reference to the dosage of radium, he said a small dose such as 10 mgrms. acts as an irritant, because it cannot be left long enough in the oesophagus. A hundred mgrms. left in for an hour or more was usually required. He did not speak as an authority; he depended upon Dr. W. H. Cameron and Dr. William Proescher for dosage and duration of the radium application in each particular case.

Suspension Laryngoscopy in Children.—Robert Levy.—Since the discovery of the laryngoscope by Garcia no more interesting chapter in the history of laryngology has been written than the most recent one by Killian in which he describes the discovery of suspension laryngoscopy. Since Killian's original communication, suspension laryngoscopy has been elaborated, its limitations and advantages have been carefully proved and commented upon. It has been generally conceded that in adults its limitations are greater than in children. All observers early recognised its value in children, even before it had been tried out in many cases.

The suspension method possesses many advantages over the ordinary direct endoscopy. These are: The entire field and surrounding parts are clearly before one; both hands are free; the dangers from asphyxia are practically *nil*; and a remarkably clear view may be obtained of the anterior commissure of the larynx and trachea. The after-effects of the suspension method are of no more serious moment than are those of the most simple laryngeal manipulation.

The technique of the procedure in children differs but slightly from that in adults. It may be said to be somewhat easier, although in no event can this procedure be considered a difficult one. The tongue need not be drawn forward; in fact, little attention need be paid to it except to keep it in the median line. The hand need not hang far over the table; in fact, if a pillow be placed under the shoulders the head may even rest upon the table. In many instances, especially when examining or operating in the oesophagus, the spatula need not be brought over the epiglottis, but, resting well at the base of the tongue, it will bring the parts into perfect view.

The question of anaesthesia is an important one in children. As a rule, local anaesthesia is not entirely satisfactory. On the whole, general

anaesthesia, preferably with chloroform, has given the author the best results.

The specific uses to which suspension laryngoscopy has been applied are: for examination; for diagnosis; for operation through the nasal passages; for the removal of foreign bodies.

A brief summary of the uses to which suspension laryngoscopy has been put and which have been reported is given, together with histories of six cases in which the method was employed by the author.

Dr. SIDNEY YANKAUER agreed with all Dr. Levy said concerning suspension laryngoscopy. He had performed a number of operations with this apparatus. In one case, after several operations by the general surgeons, the patient's neck was so scarred that the lumen of the larynx was so small that he could hardly get a probe through. The arytenoids were so adherent to the epiglottis that by the ordinary direct methods the lumen could not be seen, but with suspension laryngoscopy this could be accomplished. The passage of the first probe was followed by a larger, and finally he could pass a uterine dilator. By means of the uterine dilator he could stretch the larynx sufficiently to get a rubber tube in, which was left in for two weeks, when a larger one was used. It was thus possible, finally, to introduce the intubation tube. The boy is now going about, and has been wearing the intubation tube for about four months. The suspension laryngoscope has been modified by Killian himself as well as by others. The new model which Killian has brought out does not appear as useful as the original model. He had not been able to bring the anterior commissure into view with the new device.

Dr. SAMUEL IGLAUER was interested in Dr. Levy's remarks, and agreed with practically every point. While it was true that the procedure was less difficult in children, it could be carried out satisfactorily in adults. In bringing the anterior commissure into view one should use counter-pressure with Albrecht's instrument or the finger. Killian recommended a dose of codein, preliminary to the anaesthetic, in children. He had frequently followed this suggestion. Atropin should be used with ether in order to dry up the secretions. He had tried tonsil removal under suspension, but thought the Beck method far superior and much simpler than that of Killian. Referring to the removal of a broken safety-pin from the larynx of the child five years of age, he really did not completely suspend the patient. He introduced the spatula, and, while supporting the spatula (and thus the patient's head) with his left hand, he could see the foreign body and remove it immediately with the forceps in his right hand. He had recently introduced radium into the larynx in the treatment of a papilloma in a young child. In another infant radium was applied to the outside of the larynx. He did not know the dosage because he did not own the radium.

Dr. THOMAS J. HARRIS confirmed what Dr. Levy had said with reference to the simplicity of the method in children and the wonderful view of the larynx obtained in the average case. He referred briefly to a case in which he applied radium in a child six years of age, using the suspension apparatus, with rectal anaesthesia, 100 mgrms. of radium, of one million activity, being applied for twenty minutes. The first time he attempted to apply the radium, without the suspension apparatus, he thought it went into the cesophagus instead of the larynx. When the apparatus was employed it was very much easier to see the papilloma and to make the application of radium. He recommended the use of rectal anaesthesia in these cases.

Dr. LEVY, in reply, had not found the report of Dr. Yankauer's case

in his search for all cases to date in which suspension laryngoscopy had been employed in children. He thought the old Killian model of suspension apparatus better in children, but in adults he liked the Albrecht or Howarth modification. He had used cocain in adults, but in children he used general anæsthesia. Morphine and hyosein in cases in which a large percentage of cocain did not seem to abolish the laryngeal reflex were useful in adults. He had never been able to see why adrenalin was added to the cocain, inasmuch as it is not an anæsthetic and as there is very little loss of blood in these cases. In some cases of children with chloroform anæsthesia the adductors contracted, the vocal bands came together, and the spasm of the larynx continued for some time. In such cases a dilute solution of cocain was of advantage.

The Clinical Significance of Bacteræmia.—John E. Sheppard.—

Four cases were reported, which seemed to the author to be fairly illustrative of a considerable series of cases encountered at the Jewish Hospital in Brooklyn. The four cases and others of the group from which these were selected would appear to demonstrate that not all cases of otitic bacteræmia need operation. To distinguish between cases which do and those which do not require operation calls for one's closest observation and best judgment. As aids, all too meagre at times, it is true, in coming to a conclusion as to whether or not to operate, the author suggested the following points: (1) The general condition and appearance of the patient. Is there a markedly septic condition? Is it increasing or decreasing? As of the greatest aid in determining this: (2) The temperature curve. (3) Whether the process is localising or tending to become general? (4) Blood-counts, frequent enough to keep a careful line on the patient's resisting power. (5) Blood-cultures, sufficiently often to have a definite knowledge of the persistence of the organism in the blood, and whether the number of colonies per cubic centimetre is increasing or diminishing, thus showing whether or not the patient is in need of assistance in taking care of the bacteræmia.

Dr. ARTHUR B. DUEL thought the interesting reports by Dr. Sheppard served to emphasise certain principles in infectious processes which were of great clinical importance. It must be evident that in all infectious the general clinical symptoms usually noted are the result of the action of bacteria or their products which have been poured into the circulation. When the general clinical manifestations are slight, the infecting focus is confined to an unfavourable locality for getting into the circulation, or the invading organism is slightly virulent. Thus, a follicular tonsillitis of streptococcic origin will produce much more violent manifestations than a streptococcic otitis or mastoiditis. Similarly, a staphylococcic follicular tonsillitis, being in a favourable field for pouring its products into the circulation, may cause considerable general upset (though comparatively less than its more virulent cousins), while, confined to a bony cavity, it may cause hardly enough disturbance to be recognised. Whatever manifestation there may be, however, is undoubtedly caused by the bacterial invasion of the circulation. It may be asked, then, why bacteræmia is not always demonstrable in suppurative conditions. The answer is twofold. In the first place, the methods of examination are not sufficiently delicate; in the second place, most of the organisms are destroyed almost immediately by the blood cells. Only a few of the most virulent type are able to live and multiply in the circulation. Is a demonstrated bacteræmia, then, of no value as an operative indication? Of course it may be of the greatest value. In a case, for example, in which bac-

teræmia is demonstrated, where the blood-count shows a low resistance, and where the patient is doing badly, the obvious thing to do is to localise the process—to cut off the blood-stream at that point—without regard to whether or not there is a demonstrable disintegrating clot. In fact, in his opinion, to look upon bacteræmia alone in suppurative otitis or mastoiditis as indicative of septic sinus thrombosis is unwarranted. The bacteræmia always precedes the clot formation—indeed the alteration of the vessel wall by bacterial invasion is essential to the formation of the clot. At this stage it may not be always demonstrable by present methods, but theoretically it is present, and if methods of investigations were nice enough it might possibly be demonstrated a day before, or perhaps a week before, a recognisable clot has formed. Of course, after the clot has formed and has begun to disintegrate, the chance of demonstrating a bacteræmia is much greater, because the infecting focus is in the most favourable situation for the constant discharge of large numbers of organisms into the circulation. Yet, without a patient doing badly, one might feel quite justified in isolating the infecting area, whether bacteræmia could or could not be shown. On the other hand, with the patient doing very well, the demonstration of a bacteræmia might not necessarily demand an operation. Hundreds, of course, recover every year without its having been thought necessary to demonstrate the bacteræmia, which is undoubtedly present, and will doubtless continue to do so. One should carefully avoid taking too narrow a view of the clinical significance of bacteræmia.

Dr. CHARLES W. RICHARDSON considered the demonstration of bacteræmia an important point in the history of all cases of probable sinus infection. Whether a positive bacteræmia is always indicative of sinus thrombosis was a question still subject to considerable dispute. In cases on the borderline, as it were, the condition of the blood was of much value to the clinician, and should be of great assistance in deciding whether operative intervention was demanded. Without clear and definite indications from a clinical point of view there was no doubt that many would be loath to go into the sinus, although the experience of Gruening and others would seem to demonstrate that in cases of simple bacteræmia, without very pronounced clinical symptoms, there might be sinus thrombosis. How far one would be warranted, with the evidence of bacteræmia and without clinical evidence of sinus thrombosis, in delaying operative intervention was a question. With bacteræmia, even without clinical evidence, he would be loath to delay. Dr. Sheppard's cases were almost negative, in a certain sense, especially his non-operative cases, in which he was fortunate in that they recovered without operative intervention.

Dr. SLYMOUR OPPENHEIMER was under the impression that Dr. Duel and his *confrères* at the Manhattan Eye and Ear Hospital were no longer at variance with Dr. Lilman and Dr. Celler and others at the Mount Sinai Hospital with reference to this question of bacteræmia. At Mount Sinai it was held that acute otitis *per se* never caused bacteræmia, and these views had been corroborated by the clinical findings. This difference of opinion was thought to be largely a matter of variance in laboratory technique, the fact that the Manhattan Eye and Ear Hospital reached different conclusions being considered at Mount Sinai to be due to some error in laboratory technique. He and his associates at the latter institution had not changed their view-point at all, being still of the opinion that suppurative otitis *per se* does not cause bacteræmia. They were also of the opinion that demonstrable bacteræmia is a clinical expression of sinus thrombosis. Up to the present time they had had from ninety to

ninety-five cases of sinus thrombosis in which bacteræmia had been demonstrated in advance of operation, and in not one case had the operation failed to demonstrate sinus thrombosis. It was a curious fact that if they were wrong in their deductions they were able to demonstrate conclusively, a few hours after operation, that the blood-culture became sterile, showing that the operative procedure must have attacked some local focus which was responsible for the infection. In two hours, in some instances, the blood had become sterile. In some cases the blood-culture still remained positive, but there were other explanations, such as vegetations on the heart-valves secondary to the initial infection.

Dr. S. MACCUE SMITH asked Dr. Oppenheimer whether he depended upon the blood-cultures for indications for operation, or whether he was guided by other symptoms of the disease.

Dr. WILLIAM B. CHAMBERLIN said, if he understood Dr. Sheppard correctly, he opened the lateral sinus but made no mention of ligating the jugular. He could see no reason, under the circumstances, for not immediately ligaturing the jugular.

Dr. EWING W. DAY called attention to one point that seemed to have been overlooked. There was a tendency to take for granted that every lateral sinus patient, unless operated upon, dies. If a patient with thrombosis got well it was no indication that the sinus was not blocked. He had had cases in which the sinus was completely obliterated by clot, and he could not say that if the patient got well there was no clot.

Dr. OPPENHEIMER, continuing the discussion, said, in answer to Dr. Smith's question, he had been particularly cautious, by reason of these controversies, in not being too enthusiastic. Many cases had been admitted to the hospital with but the fewest of otitic symptoms, with suggestions of typhoid fever, possibly, with no symptoms of mastoiditis, but with a positive blood-culture. He had been extremely cautious in saying he was dealing with infectious phlebitis, and had deferred operating until all other possible causes had been ruled out. Invariably they had found a thrombotic condition in the sinus. Answering a question by Dr. George L. Richards as to whether all his ninety or ninety-five cases were operated upon, he said they were.

Dr. WENDELL C. PHILLIPS verified Dr. Day's statements. He had been struck, years ago, in operative surgery on the ear, to find occasionally an obliterated sinus from an old sinus thrombosis.

Dr. JOHN A. THOMPSON recalled having treated a brother laryngologist for suppurative ethmoiditis. He developed an abscess in the big toe, which was opened under antiseptic precautions, and examination of the pus revealed the presence of streptococci. The nasal accessory sinuses were sometimes at fault in bacteræmia.

Dr. SHEPPARD, in closing the discussion, said he simply reported four cases as a part of a group of cases of bacteræmia, many of the group being cases which had been operated upon. Regarding the tying of the jugular, he had rather settled down to the rule of not tying it if there is a reasonably good return flow from the bulb. Should there be no return flow he waited a day or two and then tied off the jugular. It was probably true, as Dr. Richardson suggested, that he was fortunate in not having bad results. Possibly more than simple good fortune is indicated by the fact that the cases referred to were selected from perhaps fifty or more cases of bacteræmia, of which he had kept careful records, and of which twenty-five at least had not been operated upon. Dr. Thompson referred to other sources of bacteræmia. This fact need always to be kept in mind. He very decidedly does not advocate operating upon all cases of

bacteræmia. Dr. Oppenheimer spoke of his cases as being cases of suppurative otitis. Three of his cases reported in the paper were non-suppurative otitis. He questioned the necessity of operating upon all these cases if they are properly watched, especially if in conjunction with a practical bacteriologist. He thought more extensive observations would ultimately teach in which cases to operate and in which surgical intervention was not necessary.

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OTOLOGICAL SECTION.

Mr. A. CHEATLE, *President, in the Chair.*

(Continued from p. 323.)

The Pathology of Acquired Deaf-Mutism.—Report by Holger Mygind (Copenhagen).—Mygind's paper consisted of an analysis of the *post-mortem* findings in 38 cases of acquired deaf-mutism reported in the literature. Of these, 17 were due to meningitis or acute disease with brain symptoms; 4 to scarlet fever; 5 to measles; 2 to head injury; and in 10 the cause was unknown. These cases represent 75 petrous bones.

In none of the cases were there any abnormalities found in the cerebral part of the hearing organ which could be considered as causing the deafness.

Pathological Changes in the Middle Ear.—Thirty-four out of the seventy-five exhibited abnormalities in the middle ear, exclusive of acute catarrh or suppuration. The predominant change was chronic suppuration, either active or healed, often combined with osseous lesions, but in no case could the middle-ear changes alone be credited with the deaf-mutism as, in practically all, abnormalities in the cochlea were also present. This points to the middle ear as being the primary seat of the disease which destroyed the hearing, but at the same time too much stress must not be laid upon this conclusion, since not only may the coincidence of changes in the middle ear and internal ear be accidental, but in cerebro-spinal meningitis labyrinthitis and otitis media may be produced simultaneously. In general, however, a distinction can be drawn, for deaf-mutism of tympanic origin is characterised by the presence of gross changes in the middle ear and of moderate changes in the labyrinth, whereas in deaf-mutism of meningitic origin the relative severity of the changes in the middle ear and in the tympanum is the reverse of that.

The route by which the disease spreads to the labyrinth from the middle ear is difficult to find. It is true that the fenestræ were frequently found to be closed by bone or fibrous tissue, but the same, though to a less extent, was found in the meningitic cases, where the process spreads from within outwards.

Pathological Changes in the Labyrinth.—In most cases the changes

in the labyrinth are obvious on naked-eye examination. In none of the labyrinths examined microscopically were changes absent. The gross changes consist of more or less obliteration of the labyrinth spaces by osseous or fibrous tissue, and of more or less destruction of the end-organs.

The vestibule was the part of the labyrinth least affected. In most cases the pathological changes were more marked in the saccule than in the utricle. The aqueductus vestibuli was frequently obliterated by bone or by fibrous tissue, especially in the meningitic cases.

The semicircular canals, like the cochlea, were more frequently affected than the vestibule, the change consisting in a total or partial obliteration of their interior by bone. On the other hand microscopical alterations of the membranous canals were less frequent than similar changes in the vestibule.

The cochlea was the part of the labyrinth where pathological changes were most frequently present.

As elsewhere, the gross changes consisted in obliteration of the cochlea spaces by bone-masses, often to such an extent as to lead observers to describe the cochlea as absent. When the obliteration was partial it affected the basal parts of the cochlea more than the apex.

Microscopic changes in the cochlea were present in all the bones examined. They varied from total absence of the basilar membrane to an almost normal appearance of the organ of Corti. Malformations of the membrane of Reissner were also described.

The nerve-tissues in the modiolus showed degeneration in about half of the bones examined. But the nerve-changes seemed to be less pronounced than the other changes in the cochlea.

The aquæductus cochleæ was frequently more or less obliterated by bony or fibrous tissue.

Pathological Changes in the Acoustic Nerve.—Changes were not invariable. Of 18 nerves examined microscopically only 6 showed changes. Of 32 examined with the naked eye, only 8 showed abnormalities, and all of the affected cases belonged to the meningitis group.

Thus the acoustic nerve does not seem to degenerate as a result of inactivity.

Summing up, the speaker drew attention to the fact that the pathological changes found in congenital deaf-mutes often resemble those of acquired cases, and so the conclusion is reached that some congenital cases are due to inflammations of the ear during intra-uterine life.

Pathologically speaking, all transitions are to be found in acquired deaf-mutism from total destruction of the labyrinth to degeneration of the neuro-epithelium of the cochlea duct only.

It is frequently impossible to distinguish between the labyrinth changes of tympanal and those of endo-cranial origin, or to trace the routes of infection in either case.

The pathology of acquired deaf-mutism is the pathology of infantile labyrinthitis which has come to its final stage and has caused lasting deafness.

The Pathology of Congenital Deaf-mutism.—Report by Dr. A. Denker (Halle).—Prof. Denker began by criticising the methods of classifying deaf-mutism which have been associated with the names of Hammerschlag, Goerke, and E. Urbantschitsch. The classification which he himself had proposed was as follows:

(1) *Innate or congenital deaf-mutism* embracing all cases referable to intra-uterine disturbances. This is subdivided into:

(a) Cases in which the changes are produced by intra-uterine inflammatory processes (meningo-encephalitis through syphilis acquired by placental infection).

(b) Cases of anomalies in formation, which are non-inflammatory in origin, such as are due to hereditary cretinoid degeneration, consanguinity, and other hereditary degenerative factors. This group is again divisible into (1) cases with non-development of the whole labyrinth; (2) cases in which the entire bony and membranous labyrinth is present but in which the epithelium is more or less degenerated. In this last group we find further divisions, namely, cases in which the epithelial metaplasia is limited to the basilar membrane; and cases with extensive epithelial metaplasia—absence or incomplete development of the sense epithelium combined with mal-position or conditions of collapse of the membranous wall of the pars inferior of the labyrinth.

(2) *Deaf-mutism acquired after Birth, or Post-fœtal Deaf-mutism.*—This is subdivided into:

(a) Cases of meningitic origin.

(b) Cases of tympanal origin (as a result of middle-ear disease).

(c) Cases in which the labyrinth changes are primary and not due to the extension of an inflammatory process in the neighbourhood (meninges, middle ear); this takes place in mumps, trauma and acquired syphilis.

With regard to the situation of the changes which lead to deaf-mutism, that is almost without exception the internal ear. While this is true, nevertheless, it is highly probable that pathological sealing up of both fenestræ, the labyrinth being otherwise intact, is capable of producing deaf-mutism. The speaker detailed three cases in support.

Turning to the first group mentioned above of congenital deaf-mutism, and to that variety in which the changes are due to an intra-uterine inflammatory process (syphilitic meningo-encephalitis), he held that while it is possible microscopically to distinguish cases of intra-uterine meningitis when it appears relatively late, on the other hand, it is impossible to distinguish, in early fœtal life, inflammatory changes from developmental malformations.

Meningitis, whether ante- or post-natal, extends to the labyrinth in the same way—namely, through the aqueductus cochleæ and the perineural and peri-vascular sheaths of the vessels and nerves in the internal auditory meatus; but in ante-natal meningitis the destruction is less than in the post-natal form, in which there is more or less degeneration of the cochlear epithelium, combined often with displacement and collapsed conditions of the membranous cochlea. Sometimes middle-ear changes are met with bilaterally identical, such as narrowing and closure of the fenestral niches, adhesion of the long process of the incus and of the posterior crus of the stapes with a Fallopiian canal closed only by connective-tissue, and with a posterior wall of the tympanum displaced forward.

These cases, on functional examination, manifest not infrequently considerable remnants of hearing.

The remainder of the paper was devoted to a detailed analysis of the pathological changes found in cases of congenital deaf-mutism recorded in the literature.

Dr. CASTEX (Paris) said that, according to his personal experience, deaf-mutes often have changes in the auditory region of the cerebral cortex. The middle ear is little affected.

Prof. UCHERMANN (Christiania) said that the pathology of acquired deaf-mutism is *chiefly* the pathology of infantile labyrinthitis, not *really*, as Prof. Mygind had said. In an examination of 800 deaf-mutes in Norway he had found eight which showed Linne negative and Schwabach positive to the same extent, and in one case—an adult deaf-mute—the hearing became normal after applying an artificial membrane. He did not agree with Dr. Castex that most cases of deaf-mutism are caused by changes in the cerebral cortex. Changes in that situation he believed to be secondary and due to atrophy from disuse.

Prof. BRÜHL (Berlin) demonstrated preparations from a genuine congenitally deaf patient. They showed hyperostoses in the posterior surfaces of both petrous bones, aphasia in the expansion of the right acoustic nerve, in the organ of Corti, the spiral ganglion, and in the right acoustic nerve itself.

Prof. KÜMMEL (Heidelberg) in a large number of cases found that of the 8 or 9 per cent. of children with hereditary syphilis—of about 300 examined with Wassermann's reaction—several of the children were of the same parentage, and among these deaf-mutism was congenital once at least. Deaf members of the same family, however, were also found without any Wassermann reaction [*sic*, ? with Wassermann reaction negative, *Trans.*], and often these were the children of parents both of whom were deaf.

Prof. ALEXANDER (Vienna) found in 70 to 75 per cent. of congenital cases sacculo-cochlear degeneration (pars superior intact, pars inferior diseased) and remnants of hearing present; whereas in about the same percentage of acquired cases the whole membranous labyrinth was affected and there were no remains of hearing present.

Dr. JOBSON HORNE (London) believed that epidemic cerebro-spinal meningitis and scarlet fever were responsible for most of the cases of acquired deaf-mutism. But he held that neither mumps nor hereditary syphilis were sufficiently taken into account as causative factors. The pedigrees collected by the Gattton Eugenics Laboratory showed that direct hereditary transmission from parent and grandparent was not very rare. A child need not be born stone-deaf to develop into a deaf-mute. Many congenital cases did not come under observation during the first two or three years of life. Parents, for various reasons, tended to attribute their child's defect to some illness or accident in infancy. It would seem, also, that a weakness or tendency to deafness is at times hereditary and may become patent with disease. Those facts rendered doubtful any estimate of the pathology of deaf-mutism alleged to have been acquired.

Dr. SPIRA (Cracow) believed the hereditary tendency to ear disease to be commoner than is usually accepted. This applied to diseases other than otosclerosis, deaf-mutism, and progressive nerve deafness. The cause could only be found in some local deficiency in resistance or in some common constitutional anomaly.

Prof. DENKER (in reply) doubted whether Dr. Castex was correct when he said that congenital deaf-mutism was more frequent than acquired deaf-mutism. Against Dr. Uchermann's opinion the fact was mentioned that bilateral congenital bony atresia of the hearing organ did not produce deaf-mutism.

Prof. MYGIND (in reply) agreed with a previous speaker, that, as regards atrophic changes in the temporal lobe of the brain, these were secondary either to disease or to the meningitis which had produced the labyrinth disease. In reply to Dr. Uchermann he said that none of his own investigations had ever brought him a case of deaf-mutism due solely

to middle-ear disease. He did not agree with Dr. Alexander in looking upon the preservation of the pars superior of the labyrinth as characteristic of congenital cases, as this part of the labyrinth is also frequently spared in acquired cases.

The "Therapy" of "Subjective Tinnitus."—**W. Kümmel** (Heidelberg).—The usual symptomatic treatment of tinnitus is injurious to patients, and the only rational treatment, apart from the removal of the causative ear disease, when that can be accomplished, is to teach the patient to come to terms with the subjective noises. This is the advice generally given to people whose tinnitus is not combined with any loss of hearing. But the speaker goes further and believes that even when the hearing is affected the patient should be instructed to ignore the tinnitus. He should be taught that tinnitus is a common sensation even in healthy people, and that its presence does not mean that the disease in the ear is getting worse, or, what is more important, that it indicates any brain disorder. The patient has learned to hear noises, and this he ought to unlearn. The ear disease may be treated, but the tinnitus must be borne, as it cannot be removed, but it will become bearable if the patient ceases to pay any attention to it, and especially if he can be convinced that it is of no special significance. Drugs and other remedies are harmful because when they cease to confer any benefit, as they do sooner or later, the patient becomes desperate. It is useful to tell the patient that the noises he hears are merely due to the blood circulating in the vessels near to the ear and so, to that extent, they are actually natural sounds which are audible even in health. It is important to persuade the patient that the sounds are physiological and not pathological.

This mode of handling people with tinnitus is both honest and useful. It distracts the patient's attention from a symptom of no importance save in his own eyes. Naturally there are some patients who will obtain no benefit when treated in this fashion.

Dr. HALÁSZ (Miskolcz) recommended abstinence from meat and eggs for prolonged periods in the treatment of tinnitus.

Dr. SPIRA (Cracow) in the tinnitus of otosclerosis advised diuretic and other remedies that lower blood-pressure. Where no objective ætiological change of any sort or description can be found Prof. Kümmel's method would be found of value.

Dr. LOUIS BAR (Nice) divided tinnitus into two groups: Endogenous which are continuous, and exogenous, which are intermittent. Congestive tinnitus, which manifests itself under the form of a humming sound, should be treated like a deeply situated arthritis. The other noises—like birds whistling, rain, etc.—are partly anæmic in origin.

Mr. SYDNEY SCOTT (London) said that for severe intractable tinnitus operative division of the auditory nerve, and extirpation of the labyrinth had been tried, but the results were disappointing.

Mr. G. J. JENKINS (London) agreed that tinnitus when not curable by operation or by general treatment, was most satisfactorily treated along the lines suggested by Prof. Kümmel.

Prof. ALEXANDER (Vienna) also agreed with Dr. Kümmel. The operative treatment of tinnitus is not to be recommended.

Prof. KÜMMEL (in reply) said that it was self-evident that in the treatment of subjective noises all remedies which are beneficial either to the local or to the general neurasthenia are to be tried.

Abstracts.

NOSE.

Carter, W. W.—The Dynamics of Nasal Development: Its Bearing on Resection of the Nasal Septum. "Annals of Otology," xxiii, p. 779.

Carter discusses the importance of the septum as a factor in the development of the nose, and concludes that the normal position of the upper edge of the septum, which constitutes the keystone, is necessary in order to maintain the integrity of the nasal arch. In removing the septum, therefore, no instrument should be used that necessitates tugging, for if this upper edge of the septum is removed or displaced a depressed deformity will result. A punch instrument is the best. The lifting force exerted by the septum is indispensable to the development of a symmetrical nose, and therefore it cannot be extensively removed with safety during the years of active nasal development. Fourteen years Carter regards as the limit of safety. On the other hand, the framework of the nose, conforming as it does to the definition of the arch, does not require any external support other than at its two extremities.

Macleod Yearsley.

Wales, E. de Wolfe.—Cauterisation of Mucous Membranes, particularly of the Nasal Mucosa. A Protest. "Annals of Otology," xxiii, p. 563.

This paper should be read by every rhinologist, and especially those on the threshold of their professional career. Wales calls attention to a fact too often overlooked: that the function of the nose is the matter of greatest importance in the treatment of all nasal diseases, and the reprehensible destruction of the nasal mucosa is so common that a vigorous protest is necessary against this practice. He ridicules the rhinology that suggests the cure of most ills by destroying some part of the nasal mucosa, with its genital and bladder spots, and its hæmorrhoidal, intestinal, hepatopancreatic, gastric, and oesophageal portions of the inferior turbinate. Cauterisation of any kind, except to save life, should never be used in the nose; and the strongest argument against it is that it increases a slight pathological condition to a graver one. The commonest result of cauterisation is cystic degeneration. Synechiæ, atrophic areas of scar tissue, crusting, purulent meningitis are other results. The author concludes: That many pathological conditions of the nose are caused by cauterisation; the application of cautery or caustics to the nasal mucosa often destroys the function of the nose. Cauterisation is a method of getting results without thought of final consequences. It is irrational and lessens the efficiency of the nose by destroying the integrity of the ciliated columnar epithelium, leaving in its place tissue which cannot carry on a single function of the nose.

Macleod Yearsley.

Arkwright, J. A.—Portal of Entry of Meningococcus Intra-cellularis. "Proceedings of Royal Society of Medicine, Section of Epidemiology and State Medicine," p. 71.

The author states that the meningococcus is present in the naso-pharynx of cases of meningitis in the early stages of the disease. Goodwin examined the naso-pharynx of fifty-two cases of meningitis and

isolated the meningococcus from twelve out of twenty-two examined in the first week, five out of fifteen examined in second week, none out of fifteen examined in third to ninth week, and one case on sixty-seventh day of disease, showing that the meningococcus may persist a long time.

Among convalescents recently under the author's observation, one man yielded a culture on the thirty-fifth day from onset. V. Lingelsheim examined the naso-pharynx of forty-nine patients in the first two or three days of the disease, and found that 93 per cent. gave positive results.

The detection of meningococci in the blood of patients affords an intelligible explanation of the route from the naso-pharynx to the meninges.

Elser made positive cultures from the blood of ten cases out of forty-one examined.
Archer Ryland.

Pegler, L. Hemington.—On Headache Associated with Intra-nasal Disorders. "Lancet," February 27, 1915, p. 435.

Pegler considers that the term "nasal," as applied to headache, should not be too rigidly employed. He classifies such headaches in three groups: simple non-inflammatory, chronic inflammatory, and a group in which inflammation or congestion is present more or less actively. In the first group headache is due to pressure.

The paper, which is a good exposition of the subject, requires reading in its entirety.
MacLeod Yearsley.

LARYNX AND TRACHEA.

Johnstone, F. M.—Primary Diphtheria of the Trachea. "Medical Journal of Australia," May 22, 1915.

The notes concern a young woman, aged eighteen. At no time did she show any sign of diphtheria in the pharynx, nor was she ill beyond having a few severe suffocative attacks, often bringing up great masses of membrane. For a month she continued to bring up casts, latterly apparently of the finer bronchi. The voice continued husky for some time longer. A pure culture of the Klebs-Loeffler bacillus was found. Antitoxin used.
A. J. Brady.

Keith, John R.—Vaso-Dilators in the Treatment of Hysterical Aphonia. "Brit. Med. Journ.," May 15, 1915, p. 847.

On the assumption that functional paralysis may be due to spasmodic vaso-constriction in the cerebral vessels, the author has been treating functional aphonia with nitroglycerin (gr. $\frac{1}{100}$ by the mouth) and amyl nitrite (both as an inhalation and by the mouth).

Two cases are reported in which benefit was obtained, but the narratives are insufficiently detailed.
Dan McKenzie.

EAR.

Sharpe, N. (New York).—Herpes Zoster of the Cephalic Extremity, with a special reference to the Geniculate, Auditory, Glosso-pharyngeal and Vagal Syndromes. "Amer. Journ. Sci.," May, 1915.

While herpetic eruptions due to inflammation of the Gasserian ganglion have long been recognised, it has only comparatively recently

¹ See also p. 339, 355.

become known that a like condition may result from an affection of other sensory ganglia of the cranial nerves.

The syndrome of geniculate ganglion involvement is herpes zoster oticus alone, or with facial paralysis and auditory complications, due to spread of inflammation to the contiguous eighth nerve.

Herpetic inflammations of the ninth and tenth nerve ganglia occur, with herpes zoster oticus, herpes zoster pharyngis and laryngis, with pharyngeal and laryngeal palsies, occasionally with nausea and vomiting, bradycardia, hiccoughing, and other symptoms of vagal irritation.

Herpetic inflammations of the eighth nerve ganglia are indicated by symptoms referable to the vestibular and cochlear nerves, such as deafness, tinnitus aurium, nystagmus, nausea and vomiting, and disturbances of equilibrium, the fully developed picture resembling a severe type of Ménière's disease.

The neural symptoms may be very slight, often clearing up in a few days or weeks, or they might be quite severe, leaving permanent disturbances of function.

The writer reports two cases of herpes oticus with facial palsy, and one of herpes occipitocolaris with facial palsy.

Emphasis is laid on the fact that the clinical picture is by no means always limited to involvement of a single ganglion, and that multiple involvement of these ganglia is not infrequent, producing a great variety of clinical combinations, which are readily interpreted if the fundamental pathological conceptions are borne in mind.

Thomas Guthrie.

Sheppard, J. E.—The Importance of Disturbed Metabolism in the Ætiology of Secretory Middle-Ear Conditions. "Annals of Otology," xxiii, p. 574.

A short but useful paper. The author considers that all cases of secretory middle-ear conditions are attributable to vasomotor disturbance, usually a paralysis or paresis, the expression of some general toxæmia due to disturbed metabolism and insufficient elimination. He points out how easily metabolism is disturbed by over-eating, even when the food taken is suitable. As to drinking, he sums it up in one sentence: "As little as possible at meals, and as much as possible between meals."

Macleod Yearsley.

Ewing, S. A.—Difficulties in Diagnosis of Intracranial Extension of Suppurative Otitis. "Medical Journal of Australia," March 27, 1915.

The presence of acute suppurative otitis does not necessarily imply that cerebral symptoms are due to it. A child with history of earache followed by discharge three days before admission to hospital. History of vomiting. Internal squint. Temperature 105.2° F. Cerebrospinal fluid clear. Mastoid antrum contained pneumococcal pus. It was not till the fifth day that the cause of the disease was evident by the presence of signs of apical pneumonia. In a suspected case of sinus thrombosis following an acute otitis, the tenderness over the external jugular vein and mastoid was explained by the presence of acute rheumatism.

On the other hand the absence of perforation of the membrana tympani, or of pus in the ear, does not exclude suppuration in the antrum and cerebral complications therefrom. Symptoms indicating intracranial complications are described.

A. J. Brady.

Shuter, R. E.—Intracranial Extensions of Middle-ear Disease. "Medical Journal of Australia," March 27, 1915.

Shuter enters pretty fully into the study on this subject, his observations being mainly founded on personal experience. It is impossible to embody the matter in an abstract. He mentions a class of case where the ear disease is mild and prolonged, in which apparently the ear has got well, but in which the patient after some weeks manifests severe intracranial complications. In these cases the infecting organism is found to be an encapsuled *Diplococcus mucosus*, which is Gram-positive.

A. J. Brady.

Perkins, Chas. E.—Report of Cases of Aural Infection with the *Streptococcus Capsulatus*. "Annals of Otol-ogy," xxiii, p. 784.

Eight cases are reported, and the author concludes: (1) That the *S. capsulatus* has a special affinity for bone tissue; (2) that in these aural infections, if the passage between the middle ear and the mastoid is large, drainage through the ear may effect a cure, so the importance of early and free incision of the drum membrane cannot be over-estimated; (3) that X-ray examination is of great help in these cases; (4) that an early and free operation is indicated as soon as irreparable mastoid involvement is certain; (5) that, whether operated upon or not, these cases should be watched closely throughout, as late complications are more frequent, perhaps, than in other infections; (6) patients advanced in life and diabetics are more liable to this infection than to other forms.

Macdonald Yearsley.

Guthrie, Leonard, and Fearnside, E. G.—Tumour of Right Cerebello-Pontine Angle. Posterior Decompression. Great Improvement. "Proceedings of Royal Society of Medicine, Section of Neurology," p. 28.

In addition to all the typical cerebellar inco-ordination symptoms, the following symptoms were associated in this case: Failure of hearing on right side; intense headache, giddiness, vomiting; nystagmus to right and left. The headache was most marked in the occipital region and accompanied by tenderness of the skull above the mastoid processes.

The nystagmus was of intense vertical and lateral character; difficulty in opening mouth; the right half of face, both in its upper and lower portions, was paretic.

A large, bilateral, subtentorial, posterior decompression was performed.

The tumour could not be removed. After the operation all the manifestations began to improve.

Archer Ryland.

Shuter, R. E.—Notes on a Case of Tumour of the Auditory Nerve. "Medical Journal of Australia," February 27, 1915.

The author describes a most interesting case of tumour of the auditory nerve.

The patient was a farmer, aged forty-three, and gave the following history: Three years ago he gradually became deaf in the right ear, this was followed by attacks of giddiness, which increased in severity; he had no tendency to fall, but used a stick to assist in walking. No headache, vomiting, or loss of weight, no pain or discharge from the ear, nor history of injury or syphilis. When he was seen by Shuter, on April 14 last, he had a tendency to fall to the right and backwards; this was more

marked when the head was turned to that side. No spontaneous error in either elbow or wrist-joints. Horizontal spontaneous nystagmus present in first degree both to right and left. Pupils active to light and accommodation. Discs blurred. Right side of face slightly mask-like, but no sensory disturbance. Dr. Shuter lays great stress upon the fact that "when the conjunctiva of the right eye was gently stroked with cotton-wool the contraction of the orbicularis was not as active as that of the left," and points to this as an important factor in the diagnosis between conjunctival anaesthesia and commencing facial paralysis.

Examination of the ears showed the right ear to be absolutely deaf, nor did this ear respond to either caloric or tuning-fork tests. Left ear normal.

The operation consisted in exposing the cerebellum in the usual way by removal of the back part of the occipital bone. On lifting the right lobe the tumour was seen but could not be defined, owing to the patient's condition; he gradually got worse and died in a few hours, "apparently from disturbance of the centres in the medulla."

The *post-mortem* examination—which was very limited—showed a tumour adherent to the pars petrosa posterior to the internal meatus. The facial nerve was torn during removal of the growth, which appeared to be arising from the sheath of the auditory nerve, and was a glioma about the size of a walnut.

It is to be regretted that the patient's friends permitted only a very partial *post-mortem* examination through the operation wound.

A. J. Brady.

MISCELLANEOUS.

Choronshitzky, B. (Warsaw).—Percanalicular Perforation of the Lacrymal Sac as a Preliminary to Intra-nasal Dacryo-cysto-rhinostomy and as a Complete Operation. "Archiv. für Laryngol.," vol. xxviii, part 3.

Under normal conditions access to the lacrymal sac from the nose is easily obtained by removal of that part of the lacrymal bone which is uncovered by other structures in the outer nasal wall. Very frequently, however, changes are present in the anterior part of the middle meatus which render the operation exceedingly difficult. Among such conditions are enlargement of the anterior end of the middle turbinal or of the cells of the incinate process, and these may, in a narrow nose, render it almost impossible to localise and open the sac. Under conditions of this kind the author has found the operation greatly facilitated by what he calls percanalicular perforation of the sac. A fine but stiff sound is passed along the lower canaliculus, without the latter being split up, and is made to enter the lacrymal sac, and then to perforate the inner wall of the sac and lacrymal bone, and so enter the nose. The sound, during this manœuvre, lies in the frontal plane and passes downwards and inwards at an angle of from thirty to forty degrees to the horizontal. The end of the sound projecting into the nose indicates the exact relation of the lacrymal sac to intranasal structures, and the exposure and opening of the sac can be easily and rapidly effected without unnecessary removal of bone.

Percanalicular perforation can also be successfully employed as a means of establishing drainage without further operation. Through the perforation made by the sound a fine cannula is inserted, and one end of a

strand of catgut is passed through the sound into the nose; to the other end is fixed a double silk thread, which is drawn through and knotted over the cheek.

Thomas Guthrie.

Thomson, G. S.—Nasal Flap and Modified Langenbeck Operation for Cleft Palate. "Medical Journal of Australia," May 22, 1915.

The principles of the operation are the elimination of the tension and the reduction of trauma and of interference with the blood supply. This is effected by the use of flaps obtained from the upper aspects of the hard and soft palates. The flaps are turned down into the mouth and united in a V-shaped manner, so that the raw surfaces of the flaps are opposed to one another. In the case of the hard palate the flaps are obtained from the nasal floor and from the septum, where the latter reaches the floor. The defects of the present operation for closing the cleft in the soft palate is the necessity of dividing the tensor and even levator palati, and the separation of the nasal portion of the soft from the hard palate. These two factors probably account for after-trouble in phonation. This defect is overcome in the present operation. The flaps to close the defective soft palate are obtained from the upper surface of same, using half the thickness of the palate.

For details see original.

A. J. Brady.

Harris, Wilfred.—Pituitary Infantilism (Lorain Type), with Hydrocephalus and Optic Atrophy. "Proceedings of Royal Society of Medicine, Neurological Section," p. 35.

The patient was aged twenty-one, height 3 ft. 8 in., weight 49 lb. Said to have had meningitis at age of two and to have ceased growing at age of six. Skiagrams show unossified epiphyses and a very large sella turcica. Vision had been failing for nearly twelve months.

Lumbar puncture showed normal cerebro-spinal fluid. Removal of 25 c.c. improved the vision decidedly.

Archer Ryland.

Griffith, Stanley.—Cervical Gland Tuberculosis. "Lancet," June 19, 1915.

An extremely interesting and valuable contribution to the subject from many points. It strongly supports the view that bovine tubercle bacilli are morphologically distinct from the human type and can be diagnosed as such, so contradicting the conclusions of the Rome Congress. Further, that in 68 cases of primary cervical glands, tuberculosis was proved by culture and inoculation. Thirty-five were of the human type and 33 were bovine. Under five years of age 9 were bovine and 1 human. Above twenty years of age 13 were human and 4 bovine. Of the last group (bovine) one patient was aged forty-one, and eleven months after removal of the examined gland wrote to say that his neck "was fuller than ever of glands." These figures confirm the accepted view that bovine is common in early life, but further they emphatically prove that adults are not exempt from that type of infection.

His experience also shows how difficult it often is to demonstrate bacilli in the gland substance, and that special measures are necessary—cultures and animal inoculation. In only 2 out of 33 "human" cases were tubercle bacilli found in moderate numbers.

One hundred and ten cases were examined. Ten of them were not tuberculous macroscopically and afforded negative results. Twenty-nine failed to produce tuberculosis in guinea-pigs, but in 15 of them tubercle

bacilli were demonstrated. These cases might be interpreted as spontaneous cures, since they were macroscopically tuberculous. The remaining 71 cases all proved positive.

The presence of short well-stained bacilli was held to be suggestive of bovine type and proved to be correct by cultures. Many cases (17) which presented but few bacilli microscopically, afforded abundant cultures.

The abstractor's experience is that tubercle bacilli of either type are rarely found in caseous tubercular glands. But they can be demonstrated by mincing and straining the gland pulp, then treating by hypochlorite and staining by the picro-fuchsin method. The characters usually accepted as bovine are short, plump, sausage-shaped bacilli, with deep and even staining, in striking contrast with the long, slender, and beaded human type.

Wyatt Wingrave.

REVIEWS.

The Extra Pharmacopœia of Martindale and Westcott. Sixteenth Edition. London: H. K. Lewis, 1915. Vol. I, 14s., and Vol. II, 7s. net.

The extraordinary demand for further editions of this work has resulted in the issue of the sixteenth edition. We have often commented on its great comprehensiveness and compactness. In regard to drugs and other agents in the treatment of disease it may almost be termed an "Enquire within upon everything." Many practitioners have found that after searching far and wide for information about some novel or strange drug they have found it in Martindale. The present edition is a peculiarly important one in view of the alterations in the strength of official solutions of one kind and another, and, further, of the substitution of chemical or English names for medicaments which have hitherto been known by artificial names of German manufacture. A very fair statement with regard to trade-marks is made by the writers, who realise the difficulties to be met with in the case of those held by alien enemies. They put in a strong plea, however, for trade-marks held by British manufacturers, recommending to the recognition of the medical profession those who take a pride in producing a pure chemical and who desire to protect it. Every progressive practitioner should read the preface to this edition from beginning to end, but at all events pages ix to xxii, in which attention is drawn to the newest remedies or the newest applications of old ones, as well as important reference to sources of further information. Such a perusal will not merely justify the expenditure of time, but will probably speedily compensate the practitioner for the cost of the new edition. Many excellent preparations for use in diseases of the throat, nose and ear are scattered through the pages, and the work will maintain its position as a therapeutic stand-by for the general practitioner as well as for the consultant.

Dundas Grant.

The Diseases of Children. Edited by Dr. M. PFAUNDLER and Dr. A. SCHLOSSMANN. (English Translation by Dr. H. N. K. SHAW and LINNEUS LA FÉTRA.) By ARTHUR J. BEDELL. Vol. VI.

Pp. xv + 430, with 130 illustrations, 9 full page insertions in colour and black, and 18 coloured text illustrations. Philadelphia and London: J. B. Lippincott Company. Price 21s. net.

The affections of the ear in childhood have, in many respects, a special character, so that the pathological pictures to which they give rise are particularly their own. Too often dismissed with but brief notice in text-books, the affections of the ear in infancy and childhood call for a special work. Hence Dr. Arthur Bedell's volume, large in size and well executed as to illustrations, would have been very welcome did it but come up to the expectations which it holds out.

The section dealing with anatomy is lucid and well illustrated in colour and in black and white; there is no fault to find with this part of the book. That which deals, however, with physiology is less to be commended, since practically the only theory of hearing with which it deals (and but superficially) is that of Helmholtz. Further, a better description than the one given of the physiology of the static labyrinth might easily have been written.

But the most astonishing part of the work is that in the clinical section the author seems utterly to have failed to realise that he is dealing with infants and children and not with adults. Either this is the case or he has not met the difficulties in his aural pædiatric practice that confront other surgeons. For example, we seriously doubt the wisdom of advocating the Valsalva method of inflation for children. Also, whilst much of the section on functional testing is excellent, the many practical difficulties that arise in testing the hearing of children make their description suited rather to a text-book of adult otology. The same remark applies to the description of the examination of the vestibular apparatus.

In dealing with the diseases which affect the ear, there is nothing very noteworthy to the reviewer. In speaking of rupture of the tympanic membrane (a rare condition in children) and its effect upon the hearing, the question of concomitant concussion is not given sufficient prominence. The section on acute middle-ear inflammation in infants and young children is good. Over two pages are devoted to the artificial drum; we would ask otologists who have much experience of their special branch in relation to children whether they think the author's statement that he is "in the habit of using soft rubber caps which the patient can himself insert or remove with a forceps" is either apposite or wise in regard to children. Otosclerosis is well-handled, and from the description given it may be gathered that the author concludes that a considerable number of cases begin in childhood.

In a work upon the ear in children, one turns with special interest to the subject of congenital deafness, but here again disappointment awaits us. Dr. Bedell's passages thereon do not convey very clear ideas upon the subject, and, from their perusal, it is doubtful whether he has had much experience of deaf-mutism, so-called. During the past decade much valuable work has been done in this department, but even Kerr Love's monumental researches are passed over in silence. One glimmer of light appears, however, in the sentence which describes England as being "the country which takes the best care of its deaf-mute children," although we would rather see the word "deaf-mute" exchanged for "deaf."

The book would be excellent in many respects if it could be taken as a text-book of general otology, and that part dealing with children were omitted or re-written, but as a work on pædiatric otology it falls hopelessly short of its mark.

Macleod Yearseley.

NOTES AND QUERIES.

SIR FELIX SEMON AND THE INTERNATIONALES CENTRALBLATT FÜR
LARYNGOLOGIE.

The *Internationales Centralblatt für Laryngologie, Rhinologie, etc.*, which was founded by Sir Felix Semon, contained in its issue for June (Jahrgang XXXI, Berlin, Juni, 1915, No. 6) a declaration, of which the following is an accurate translation:

"DECLARATION.

"In the *Times* of July 12 there is an open letter from Sir Felix Semon as follows:

"To the Editor of the '*Times*.'

"Sir,—For many years I believed in the possibility of a better understanding between this country and Germany, and it was a most bitter disappointment to me when the great crash came last year. Even then I hoped that it would suffice for a naturalised British citizen of German extraction loyally to do his duty by his adopted country without making any public expression of his faith. The inhuman methods of German warfare, however, have often and of late with ever-increasing force, induced me to think that it would be right for a German by birth to publicly express his detestation of that policy. What has hitherto deterred me from doing so has been the fear that such a statement might be misconstrued as a desire to personally court favour. But now that Sir Arthur Pinero in the letter published in *The Times* of to-day has pointed out that an attitude of continued silence might be interpreted as 'sitting on the gate,' I beg to say that I emphatically abhor the barbarous methods, one and all, employed by Germany.—Yours obediently,

"FELIX SEMON.

"Rignalls, Great Missenden, May 11.

"When Sir Felix Semon, surely misled by the lying reports of the Press inimical to Germany, wrote this letter in which he publicly takes a stand against the land of his birth, he must have known that he thereby caused sincere pain and bitter disappointment to his German friends and colleagues. Sensible and far-seeing as he is, he surely could not be in doubt for a moment as to the effects which were bound to result for his further relations with everything which connected him with the old Fatherland. Nor could he doubt that the same conditions would apply with regard to his relation with this *Centralblatt*, which he has founded, edited for a quarter of a century and made successful, and which in memory thereof still bears his name. For, although this journal is an international one, intended to transmit the results of scientific work in the *whole* domain of our speciality to the specialists of *all* countries, and although it has always most carefully kept this international character, yet the fact remains that it is being published in the German language and in the capital of the German Empire.

"The Editor and Publisher, who are proud to be Germans, consider it to be further irreconcilable with the fact, that at the head of this journal the name of a man should appear who in a public declaration has sided against their Fatherland, and hence they feel compelled to declare to their keen regret, and whilst still gratefully acknowledging Semon's achievements with regard to this journal, that the name of Semon in the title of the '*Centralblatt*' will henceforth be omitted.

"The Editor and Publisher of the *Internationales Centralblatt für Laryngologie*,

"Professor Dr. G. FINDER,

"August HIRSCHWALD."

Owing to his letter to the *Times*, Sir Felix Semon's name has already been expunged from the list of honorary members of the Vienna Laryngological Society and the Berlin Laryngological Society, and it may be inferred that he will be stripped of his various German, Austrian, and Hungarian honours. But the action of Professor FINDER and Herr HIRSCHWALD, in removing the name of Semon from the famous scientific periodical which he founded, is on a different plane. Semon's *Centralblatt* was the only international rhino-laryngological journal. It is simply an accident that it is published in Germany, and the deletion of the founder's name

is an international offence. It has been resented as such by the withdrawal from the conduct of the journal of Dr. Emil Mayer, the American collaborator, and of Dr. Peter MacBride, Dr. H. J. Davis, Dr. Logan Turner, and Dr. P. Watson-Williams, British editorial contributors, who have seen the above declaration.

THE RELATIONSHIP OF INTRACRANIAL TUBERCULOSIS TO MIDDLE-EAR TUBERCULOSIS.¹

Some of the older writers, such as Macewen, appear to be strongly of opinion that intracranial tuberculosis may be directly due to the spread of the disease from the ear in cases of tubercular otitis media. Macewen ("Pyogenic Infective Diseases of the Brain and Spinal Cord," Glasgow, 1893, p. 125) holds that the mastoid region, including the antrum, may be invaded by tubercular granulation tissue without the tympanic cavity participating to any great extent in the process. Such cases may hear fairly well. Macewen states that tubercle occasionally spreads through the tegmen tympani or petro-squamosal suture to the brain membranes, producing lepto-meningitis. When this occurs early, before much destruction of bone has taken place and before the tympanic membrane has ruptured, the primary focus is apt to be overlooked, and the cases are described as ordinary tubercular lepto-meningitis.

Abscess of the brain seldom follows tubercular disease of the middle ear, and when it does occur it is generally superficial and in immediate proximity to the tubercular perforation. Such a superficial cerebral abscess frequently communicates with the middle ear by a minute passage through the granulation tissue surrounding the perforation in the bone.

The sigmoid sinus is not infrequently exposed by tubercular erosion of the sigmoid groove. This may occur long before there is any evidence of thrombosis of the sinus. According to Macewen an acute infective process may be superimposed upon the tubercular one in the sinus, since the degenerating and liquefying tubercular focus presents a highly favourable medium for the cultivation of pyogenic organisms.

Macewen records the following case: Child, aged six months (bottle fed) with enlarged peritotic glands on right side; general fretfulness; right drumhead thickened with marginal perforation and granulations; slight facial paresis (right). Case too far gone for operation. Death from lepto-meningitis. *Post mortem*: Serous lepto-meningitis without any detectable tubercles in the pia mater, which was firmly adherent to dura over the tegmen. At this point the dura was a bright red colour and showed a series of tubercles arranged in two crescentic lines—the one above and external to the petro-squamosal suture, the other on its inner side over the tegmen. This proved to be a tubercular invasion of the dura through the petro-squamosal suture directly continuous with the tubercle in the middle ear. The intestinal glands were slightly enlarged.

Körner (*Die otitischen Erkrankungen des Hirns*, etc., Wiesbaden, 1908) holds that it is not possible to be sure if we are merely dealing with a simultaneous tubercular affection of the ear, meninges, and brain, or if the tubercular affection of the cranial contents is the result of the disease in the temporal bone. The latter supposition is probable if there is in the body no older focus of tuberculosis than that in the ear. Pitt (*Brit. Med. Journ.*, 1890, vol. i, p. 772) has observed such a case. Körner records the results of a *post mortem* which revealed tubercular cavities at both apices and a few miliary nodules in lungs, kidneys, etc. On removing the brain it was found that a portion of the temporal lobe adhered to the roof of the tympanic cavity. A thrombosed pial vein could be traced from this brain tubercle, and both Sylvian fissures showed numerous tubercles in the pia mater. The right sigmoid sinus contained pus and the superior petrosal was thrombosed. The middle-ear spaces on the right side were full of pale granulations, the sinus groove was carious, and the vessel wall was covered with granulations. The inner wall of the middle ear presented a large sequestrum, which included the cochlea, part of the canals, the Fallopian aqueduct, carotid canal, and jugular fossa. The upper end of the jugular vein was filled with pus. Similar cases are recorded by Macewen, Koeh, and Piff. On the whole, Körner is not so certain as other writers that intracranial tubercle is not due to direct extension of aural tuberculosis, but is merely part of a general tuberculosis.

J. S. F.

¹ See JOURNAL OF LARYNGOL., RHINOL., AND OTOL., June, 1915, p. 209.

DO BACTERIA ENTER BY THE TONSILS?

F. H. Thiele and Dennis Embleton have recently shown a series of precise observations that bacteria do *not* enter by the tonsils into the lymphatic system. The tonsils of guinea-pigs having been swabbed by cultures of the colon bacillus and other organisms, a systematic *post-mortem* examination of the adjacent glands and structures in every case proved negative.

Such evidence is of the greatest significance, as it emphatically contradicts accepted views and teaching.

Experiments were also made in connection with the conductivity of perineuronal sheaths, the subarachnoid space and various mucous and serous surfaces (*Proc. Roy. Soc. Med.*, March, 1914).

WYATT WINGRAVE.

NEW REMEDIES.

'LUBAFAX' SURGICAL LUBRICANT.

Burroughs Wellcome & Co. have introduced a preparation, with the title 'Lubafax' Surgical Lubricant, which can be relied upon to answer the requirements of urologists, gynecologists, accoucheurs, and medical practitioners generally. For catheters, colon and rectal tubes, specula, sounds, rectal and vaginal nozzles, and in obstetric operations, this preparation will be found a most serviceable antiseptic lubricant. It is suited also to the lubrication of instruments like the naso-pharyngoscope, etc.

'Lubafax' Surgical Lubricant is without injurious effect upon either instruments or their rubber attachments, and will be found non-greasy and non-irritating as an application to the hands.

It is a bland jelly, readily soluble in water, and is put up in collapsible tubes, which are most convenient and cleanly in use. The tubes are enamelled and the printed matter on them is incapable of being transferred to the hands.

THE
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**A SHORT NOTE ON A SIMPLE APPARATUS FOR
APPLYING IONIC MEDICATION TO THE
NASAL CAVITIES.**

BY ARTHUR J. HUTCHISON, M.B.,
Surgeon, Brighton Throat and Ear Hospital.

IN his book on "Ionic Medication," Dr. Lewis Jones describes several methods of applying ionic medication to the nasal cavities and accessory sinuses. He says ("Ionic Medication," 2nd edition, pp. 57, 58) "Gautier, in 1892, advocated the treatment of ozæna by electrolysis, or, as we should now term it, by 'ionisation' with copper. He made use of needles of the metal which were inserted into the affected parts of the mucous membrane of the nose, usually of the middle turbinated bone. Currents of 15 to 20 milliampères are given for fifteen minutes or longer, the parts being well cocaineised beforehand. Another method is to use copper rods covered with a moist material, wet with a solution of sulphate of copper, and to apply somewhat similar strengths of current. In the *Revue Internationale d'Electro-thérapie* for 1892 and the following years a number of papers on the ionic treatment of ozæna can be found. Although in recent years the treatment seems to have been forgotten, there is no doubt that very striking good results were obtained from it. Probably zinc would be as effective."

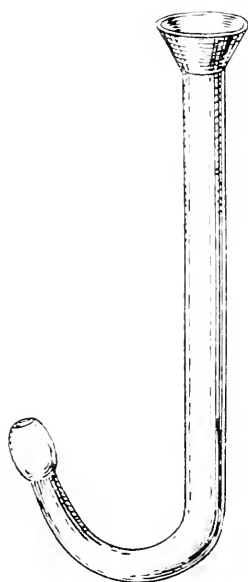
Leduc reports good results in the treatment of ozæna with zinc

ionisation. A zinc electrode is wrapped up in cotton-wool soaked in a solution of a zinc salt and introduced into the nose. Others have reported cases treated in this way. In this method of ionising the electrode must be introduced more or less blindly into the nose, and the current will flow only into those parts of the mucous membrane against which the cotton-wool happens to lie. This difficulty can be overcome to some extent by packing the nose with a long strip of gauze, moistened with the required solution, in the middle of which the electrode is buried. By this means a much more accurate distribution of the current, with its ions, is obtained. It is, however, a tedious business, and if it is being employed for the treatment of conditions other than ozaena it is very apt to be interrupted by a fit of sneezing.

A much simpler technique is that described by MacNab (JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, 1913, p. 642). He uses a rubber bag firmly fastened to one end of a straightened Eustachian catheter, to the other end of which rubber tubing with a clip is attached. The rubber bag on the end of the catheter is passed through the nose to the nasopharynx and distended with water so as to block the choana completely. Then, with the patient lying on his back and the head gently extended over a pillow, the nasal cavity is filled through a large sized vulcanite speculum with the required solution and the electrode passed through the speculum into the fluid. When the current is turned on it will be distributed pretty evenly over the whole mucous membrane of the nasal cavity. This method would seem to be quite simple, but in practice I have found it unsatisfactory for two reasons: (1) The rubber bag when distended does not block the choana completely, therefore some of the solution constantly trickles into the throat and is swallowed; (2) the rubber bag expands into the nasopharynx and makes the patient retch, or at least gives rise to discomfort and a desire to swallow. My patients did not like it, and, indeed, many would not stand it.

The advantages of this method can be retained and its disadvantages obviated by a very simple apparatus. A piece of glass tubing (say half an inch external diameter), about 10 or 11 in. long, is expanded at one end into a funnel, the other end is blown into an olive of size and shape suitable to fit a nostril, like the olive used in connection with a Politzer's bag. This end is bent round in a wide curve till the axis of the olive is nearly parallel to the axis of the tube. The patient sits at a table with his head bent well forward over a basin. He takes the tube in one hand and fits

the olive tightly into one nostril, the tube lying upright beside the ear. The surgeon then pours the desired fluid into the tube till a few drops flow out of the other nostril, thus showing that the first side of the nose is full of the fluid. If both sides of the nose are to be treated, a similar tube is introduced into the second nostril and the solution poured in till it rises to the same level as the fluid in the first tube. Both sides of the nose are then full of the fluid. The active electrode should be long enough and flexible enough to be passed into the tube till its end lies in the olive. For instance,



Glass tube for ionic medication of the nose.

if the zinc ion is to be used a flattened wire or ribbon of zinc 12 in. long and flexible enough to go round the curve of the glass tube answers the purpose. The electrode should be in the tube before the latter is adjusted into the nostril by the patient. Of course, if both sides of the nose are being treated at once, two glass tubes are required and two zinc electrodes connected with the positive pole. It is well to test the current before use, to be sure that it will flow equally through both electrodes. The indifferent electrode may conveniently be placed in a basin of water in which the patient's free hand, if one side of the nose is being treated, or elbow, if both sides are being treated, is immersed.

The solution of zinc sulphate should not be stronger, to begin with at any rate, than one grain to the ounce. MacNab uses 1 per cent. solution, but I have found this far too painful.

During the sitting the patient must breathe through the mouth and must not swallow. The act of swallowing sucks the fluid out of the tube and may break the circuit and thus give the patient an unpleasant shock. Saliva is simply allowed to dribble out of the mouth into a basin over which the patient's head is hanging. As a rule it is quite easy for a patient to fit the tube water-tight into the nostrils. Some noses are more troublesome to block than others, but a little manipulation of the tubes will generally succeed in getting an absolutely water-tight fit. Should a slight leak persist the surgeon must occasionally pour a little more solution into the tube as required.

These tubes are made for me by a glass-blower for 1s. 6d. each.

It is not my purpose in this note to give details of cases treated by this method, as I have not yet had sufficient experience with it. But I may say that in (1) ozæna I have obtained useful results, *e. g.* the first patient I treated was a patient with genuine ozæna who, in spite of treatment elsewhere both in England and abroad, had not been able to get rid of the stench. After a few sittings he was able to keep the nose sweet and he continued thus till he left Brighton some months later (I then lost sight of him). In his case I used a 2 per cent. solution of K. I., kathodes in the nose, and current up to 5 milliamperes for ten minutes. (2) In some cases with watery discharge from the nose, the nose more or less free during the day but obstructed when in bed at night, a few ionisations have given great relief; *e. g.* a lady who had been treated for this condition elsewhere by galvano-cantery a year before without any improvement (she had also lost her sense of smell) came to me lately. During the spell of dry weather this spring she had been better and the sense of smell had returned, but later in the year all her symptoms again became as bad as ever. After three ionisations with zinc she could sleep quietly all night with her mouth shut, and the sense of smell had returned, though not perfectly. One other case regained her sense of smell to a slight extent after one ionising with zinc, though it had been completely absent for more than two years. Other cases of a similar nature have not improved at all, and I do not know how one can tell whether a case will respond to the treatment or not except by trying. MacNab says that if a case is going to respond to ionic medication it will begin to do so after one or two sittings. (3)

Patients who have been operated on for empyema of antrum or other accessory sinns and in whom discharge persists or recurs I have ionised, some with pot. iod., some with soda salicylate with kathode in the tube, some with zinc sulphate with anode in the tube, but the results on the whole have been very poor. In only one case was the suppuration definitely stopped.

From my slight experience of the method I am led to believe that ionic medication will prove useful in some nasal conditions, and my purpose in describing my tubes is to bring before my *confrères* an inexpensive and simple means for applying the treatment.

THE ETIOLOGY OF OTOSCLEROSIS.¹

BY W. SOHIER BRYANT, A.M., M.D.,
New York.

Abstracted by J. S. FRASER,
Edinburgh.

PART I.—ÆTIOLOGY OF OTOSCLEROSIS.

Internal Secretions.—Manasse has found in cases of goitre bony changes similar to those in otosclerosis. Improvement in otosclerosis has been noted on the administration of thyroid extract. Alexander, Siebenmann, and Mayer have observed deafness and bony changes in cretins exactly resembling those present in otosclerosis.

Sohier Bryant thinks that the cerebral pituitary, the suprarenals, the parathyroids, and the ovaries have an intimate relation to otosclerosis.

Axhausen says that changes in the internal glandular secretions—especially the thyroid—determine the dystrophic processes of bone. Epidemic osteomalacia occurs in goitre districts.

Ovarian extract may have an effect similar to thyroid extract, and it is noteworthy that some observers hold that the ovaries are the cause of osteomalacia. Hyperactivity of the ovary is believed

¹ For the making of this abstract Dr. Bryant has kindly supplied an English translation of his article on otosclerosis ("Die Ätiologie der Otoklerose," "Osteodystrophia petrosa Bryant") which appeared in the *Monatschrift für Ohrenheilkunde*, 1913, pp. 436 and 584. For the references the reader is referred to the original article. Dr. Bryant's article is interesting because it attempts to bring otosclerosis into line with other non-suppurative lesions of bone.—J. S. F.

to cause reflex dilatation of the vessels. Cases of osteomalacia may be cured by ovariectomy.

It is supposed that the trophoneurosis is transmitted to the bone by way of the sympathetic fibres.

Bossi maintains that the suprarenal gland is the cause of osteomalacia and has reported cases of cure of osteomalacia in pregnant women by the use of suprarenalin.

Axhausen holds that the parathyroids influence osteodystrophic process and that the cerebral hypophysis may act in the same way.

Female Sex.—It is generally admitted that in otosclerosis the female sex is more affected than the male. This is probably due to parturition, disorders of menstruation, or prolonged lactation. Further, women suffer more often from anæmia.

Bezold's statistics show that from 57 to 66 per cent. of cases of otosclerosis occur in women, while only 42 per cent. of all ear diseases are found in the female sex. Seven per cent. of all ear cases suffer from otosclerosis.

Intoxication due to Pregnancy or the Puerperium.—The temporal bone may be affected by the bony changes which occur in the puerperium, and in this way otosclerosis may be produced. Politzer first suggested the relation of otosclerosis to the puerperium. He thought it was a true infective puerperal osteitis.

Veterinary surgeons note that milch cows alone are affected by osteomalacia.

Osteophytes on the skull occur in pregnancy.

Osteomalacia is rare in males, and after puberty osteomalacia occurs only among women.

Infection from the Nasopharynx by way of the Eustachian Tube.—Solier Bryant holds that the commonest source of infection is the nasopharynx. He believes that toxins from this region affect the thyroid and also the hypophysis through reflex paths. In the same way puerperal pelvic infections cause dystrophic bone changes in the pelvis. Bryant believes that treatment of the nasopharynx may improve otosclerosis. He says that chronic infection of Luschka's tonsil is the most important factor, as this structure supplies the toxic material which affects the sympathetic nerve-supply of the pituitary bodies and thyroid gland. The results are tropho-toxic changes affecting the vessels of the petrous pyramid and resulting in the bone lesion of the labyrinthine capsule.

Mueller and Heimann also hold that abnormal conditions in the nose and pharynx are ætiological factors in otosclerosis. Other writers hold that repeated attacks of cold in the head and naso-

pharyngeal catarrh may lead to otosclerosis, while others believe that exposure to severe cold may bring on the disease.

Otitis Media.—Lucas held that otosclerosis cannot be distinguished from chronic middle-ear catarrh. Sohler Bryant says that otosclerosis may follow suppurative otitis media and calls this the *secondary form of otosclerosis*. According to Bryant the majority of cases of otosclerosis, even of those with a history of hereditary deafness, belong to this secondary type. Habermann and Katz believe that middle-ear inflammations predispose to otosclerosis. Siebenmann has shown that the bony outer wall of the labyrinth is partly supplied by vessels from the middle ear. The redness of the promontory in otosclerosis suggests that certain cases of the affection arise from the tympanic mucosa. Habermann, Katz, and Manasse hold that otosclerosis may be induced as a secondary change after a simple inflammation or catarrhal condition of the middle ear. According to Katz the primary pathological process in otosclerosis is invariably inflammatory, and is situated in the muco-periosteal lining of the tympanum. It is transmitted to the bone along the vascular walls in the same way as the chronic vascular osteitis of Volkmann.

Moeller states that otosclerosis occurs first at the point of entry from the tympanic periosteum. Ferreri also says that otosclerosis may arise in the periosteum of the middle ear.

On the other hand, Bruehl believes that the thickened periosteum is probably secondary to the bone change.

Auto-intoxication.—Gastro-intestinal auto-intoxication is a frequent cause of otosclerosis, and the subjective symptoms of this condition may be relieved by treatment of the digestive affection. Ferreri and Yearsley both lay stress on the importance of auto-intoxication.

Circulatory Disturbances.—O. Mayer holds that functional disorders of the vasomotor system are of importance in the production of otosclerosis. The otosclerotic foci are symmetrical and correspond in location to the terminations of the nutrient arteries of the pyramidal bone. The internal auditory artery supplies not only the membranous labyrinth and the endosteum, but also the cartilage bone which lies next to the endosteum and surrounds the hollow spaces of the labyrinth. Mayer holds that this bone is not the seat of otosclerosis. According to Mayer, the process is as follows: There is an insufficient blood supply in the terminal vessels owing to constriction of the vessels. This leads to a state of malnutrition of this part of the bone, with the resulting forma-

tion of fibrous marrow. If the circulatory disturbance continues, there is resorption of the fibrous marrow resulting in the production of cysts in the interior of the bone. If, on the other hand, the vasoconstriction is followed by an increased blood supply, there is a new formation of bone in the marrow spaces together with hyperostosis and exostosis.

Arteriosclerosis.—Cornet reports that 50 per cent. of his otosclerotic cases had arteriosclerosis. In many cases of otosclerosis we find on microscopic examination that there is atrophy of the stria vascularis and of Corti's organ, just as in senile deafness due to arteriosclerosis. O. Mayer has found atheroma in the internal carotid and auditory arteries in otosclerosis.

[It is curious that otosclerosis is common in young and otherwise healthy girls. Surely these cases cannot be due to arteriosclerosis.—J. S. F.]

Anæmia.—Many authors lay stress on the importance of anæmia in the causation of otosclerosis.

Nervous Affections.—Severe psychic traumatism, *e.g.* shock, fright, grief, anxiety, mental exhaustion, and neurasthenia favour the development of otosclerosis.

Some authors are of opinion that a nerve lesion is the primary factor (Baginsky). In almost all cases nerve changes have been found in the inner ear on microscopic examination, even in cases where the foci of diseased bone were very small (Manasse). Others hold that the nerve changes in the labyrinth are due to the bone lesion (Siebenmann).

Osteomalacia is also said to be a trophoneurosis dependent on disturbances in the female sexual organs, especially in the ovary. These disturbances are transmitted to the bone by the sympathetic nerves.

Lumbar puncture may ameliorate the symptoms of otosclerosis.

The diminution or absence of the sensibility to tickling in the external auditory meatus indicates the presence of a nerve lesion (Froeschels).

According to Panse four cases diagnosed as otosclerosis were found on examination to have degeneration of Corti's organ and rigidity of the stapes, but no bone lesion.

Infections.—Infectious diseases are causative of secondary peritis and osteitis of the labyrinth capsule (Hammerschlag).

The scleroses produced by certain infections are limited to particular vascular areas, *e.g.* sclerosis due to variola affects the

pulmonary arteries. Hence the possibility exists that certain infections may influence the pyramidal bone in a similar way.

Rheumatism, Gout, and Arthritis.—Many authors have noted a connection between these diseases and otosclerosis. Sohler Bryant holds that though these diseases are often found in cases of otosclerosis, it is more probable that all the conditions are due to a common cause than that rheumatism, gout, etc., give rise to otosclerosis.

Syphilis.—Gruenert, Manasse, Heymann, Heine, Katz, Shambaugh, Heimann, Gradenigo, and Paludetti all regard syphilis as a predisposing cause. Habermann, who reports a case with marked luetic changes in the vessels, holds that the syphilitic cause of otosclerosis is shown chiefly by the histological findings of chronic inflammation extending to the bone from the periosteum by way of the vessels, without suppuration or necrosis. The presence of hyperostoses and also the porous composition of the bone, favour a syphilitic origin.

Bezold, from an experience of over a thousand cases, does not believe in the causal relationship of syphilis. Beck and others have tested the Wassermann reaction in many cases of otosclerosis and found it positive in a very small percentage (five times out of forty-four cases). Gray notes that syphilis is more common in men, while otosclerosis is more common in women.

Osteitis.—Scheibe, Heimann, Katz, and Habermann consider that the bony lesion in otosclerosis is an inflammatory osteitis. Mayer holds that otosclerosis is closely allied to the osteitis fibrosa of von Recklinghausen. Manasse compares otosclerosis to the vascular ostitis of Volkmann. Sohler Bryant says that both in otosclerosis and in osteitis we find increased vascularisation, displacement of the normal bone by osteoid tissue, exostosis and hyperostosis, the line of demarcation or Pommer's cementing line, the origin in the endosteum or from the periosteum, and finally resolution by new atypical dense bone.

Osteomalacia and Rickets.—Ferrerri says that in many cases of congenital deaf-mutism the loss of hearing is due to an early attack of capsulitis labyrinthi in fetal life. This attack is coincident with maternal intoxication or other affections such as rickets or osteomalacia which are due to diplococci. All the osteomalacic patients seen in Arcangeli's clinic had evident otosclerosis. The administration of a vaccine improved the osteomalacia and also the otosclerosis. Ferrerri claims that rachitic lesions of the labyrinth capsule can be recognised in the new bone. Rickets and osteo-

malacia are ætiologically the same. The differences are merely quantitative and depend on the predominance of halisteresis and the proliferation of osteoid tissue.

Old Age.—Bryant has observed that otosclerosis has a tendency to appear in old people—probably as a result of tropho-toxic changes.

Tuberculosis.—According to Katz the scrofulous constitution bears a causative relation to otosclerosis.

Traumatism.—J. Moeller states that constant exposure to noise or traumatism may be the predisposing or exciting causes of otosclerosis. Mayer points out that vasomotor neuroses may follow trauma. According to Bruehl the anterior margin of the oval window is specially vulnerable on account of the greater movement of the anterior part of the foot-plate of the stapes, and also because of the presence in this region of the pulley of the tensor tympani muscle.

Thrombosis.—Gray holds that otosclerosis is due to thrombosis of the small blood-vessels and that the areas of otosclerosis are really areas of aseptic necrosis. The bone dies and, as it is not infected, becomes absorbed. Bruehl states that the diseased areas present the appearance of an enucleable foreign body. It is possible that syphilitic changes in the vessel wall may lead to thrombosis, and Yearsley points out that the puerperium favours stagnation in the capillaries.

Otosclerosis an Idiopathic Primary Bone Disease.—This view is held by many great otologists, *e. g.* Politzer, Bezold, Siebenmann, Möller, Bruehl, and Schwartze. These writers deny that otosclerosis is an inflammatory condition. Gray also states that in cases of otosclerosis there are no signs of past or present inflammation in the tympanic cavity. Politzer and Bruehl point out that the otosclerotic foci are separated from the periosteum by layers of normal bone, and that they may even occur in the region of the internal meatus where there is no mucosa. Ankylosis of the stapes is by no means always present.

Under normal conditions growth should cease in the labyrinth capsule at or soon after birth, though it continues in other bones. Siebenmann views otosclerosis as the continuance of a process of growth in the labyrinth capsule, in the regions where remnants of embryonic cartilage most abound.

Taniyama has found marked remains of the primitive cartilaginous capsule of the otic vesicle in the bone in the anterior margin of the oval window in the foetus at various ages, and also in children and even in adults.

Heredity.—Before discussing the question of heredity it is necessary to again remind the reader that there are probably two forms of otosclerosis: (1) primary otosclerosis, which is markedly hereditary, and (2) secondary otosclerosis, which follows inflammatory conditions in the middle ear.

Statistics with regard to the frequency of a family history of otosclerosis in patients suffering from this disease vary considerably, *e. g.* Siebenmann, 35 per cent ; Denker, 40 per cent. ; Bezold, 82 per cent. Mayer holds that, as in arteriosclerosis and the vasomotor neuroses, the causative factor in otosclerosis is transmitted. Woakes held that this causative factor was a defect in the sympathetic ganglia. Hammerschlag says that otosclerosis is congenital and is due to abnormally differentiated germinal cells. Hammerschlag classes hereditary congenital deaf-mutism, hereditary nerve deafness, and primary otosclerosis as different forms of the same disease. Yearsley states that otosclerosis is transmitted in the female line. Alexander believes that the congenital predisposition to otosclerosis only begins to develop at puberty.

PART II.—PATHOLOGY OF OTOSCLEROSIS.

Blood-vessels.—In otosclerosis the first change is increased vascularity of the affected bone and of the thickened mucoperiosteum overlying it. The normal bone is replaced by very vascular osteoid tissue. The vessels are merely dilated capillaries. In the later stages the number of the vessels is diminished. In osteomyelitis, rickets and osteitis fibrosa, the initial change is an intense vascularisation of the marrow.

Endosteum.—The dissolution of the compact bone by the proliferation of the marrow is the essential feature of otosclerosis. In the affected parts the marrow is lymphoid and only later becomes fibrous. In osteomalacia and rickets the disease process begins with endosteal proliferation and vascularisation of the marrow, while in osteitis fibrosa the process consists in a disintegration of the bone starting in the marrow.

Haversian Canals.—Otosclerosis begins in these preformed vascular spaces which become larger and are filled with new connective tissue and new blood-vessels, *i. e.* granulation tissue. In some cases buds grow from the periosteum into the Haversian canals and absorb the bone. Katz says that in otosclerosis new medullary spaces are formed. In the older parts of the lesion the spaces are smaller, the cells fewer, and the fibrous tissue more

marked. In osteomalacia and rickets one of the initial changes is the dilatation of the Haversian canals, while in osteitis fibrosa there is a marked new formation of these canals.

Absorption of Bone.—In otosclerosis the dense petrous bone is traversed by newly developed vascular channels, and the absorption of bone proceeds from these marrow spaces, through the proliferation of connective tissue cells and the formation of granulation tissue. The cartilaginous bone (interglobular space bone) is absorbed without the presence of osteoclasts and is replaced by new bone. The absorption is due to atrophy caused by the pressure of the new tissue. In its turn the new osteoid tissue is absorbed by osteoclasts. In osteomalacia and rickets, the softening of the bone starts from the medullary canals.

New Bone Formation.—In otosclerosis there is a true formation of new bone or osteoid tissue and not merely a transformation of the old bone. Manasse has observed a bunch-like mass of new bone projecting into the old compact bone from the wall of a vascular space in the normal labyrinth capsule. The new formed bone has a strong affinity for basic stains such as hæmatoxylin and therefore appears dark blue. [New formed bone laid down in the deep layer of the periosteum of the mastoid air cells in cases of subacute mastoiditis does *not* take on the basic stain, but stains pink with eosin.—J. S. F.] In the later stages of otosclerosis osteoblasts form osteoid tissue in the walls of the enlarged lymph spaces in the new bone. Thus in time the new bone becomes sclerosed and consists of a network of irregular lamellæ which stain strongly pink with eosin. The cavities in the older parts of the new bone contain fewer cells and larger vessels, as well as a large amount of connective tissue; in other words, the cavities contain fibrous marrow which may become fatty marrow or may calcify. The new bone has no cartilaginous interglobular spaces, and finally becomes sclerotic and entirely free from marrow spaces. In osteomalacia and rickets the newly formed bony tissue is absorbed (osteoporosis). In osteitis fibrosa the disintegration starts in the marrow and is followed by reformation.

Osteoporosis.—Rarifying osteitis is the essential characteristic of otosclerosis. Katz found spongy bone in the squamous portion of the temporal bone of a cat, whose labyrinth capsule showed otosclerosis. In this case also, the malleus, incus, and stapes were all affected by osteoporosis. Cysts may occur in the otosclerotic lesions. In Paget's osteitis deformans, in osteomalacia and in rickets we find osteoporosis, as also in the early stages of syphilitic

affections of bone, osteo-arthritis, and those changes in bone associated with pernicious anæmia.

Hyperostosis and Exostosis.—In otosclerosis the periosteum forms new bone in the shape of irregular hyperostoses. In the region of the oval window this in time leads to ankylosis of the stapes. In syphilis, in osteitis deformans, and in rickets hyperostoses occur.

Character of the Cells.—In the new osteoid tissue of otosclerosis the connective tissue cells are very numerous; round, spindle, and cubical cells are present as in ordinary granulation tissue. Myelocytes and nucleated red blood-corpuscles are always absent, and so the tissue is not true marrow. Later on the cells become fewer, and occasionally true fat cells are found.

Osteoclasts are rare at the margin of the otosclerotic tissue, but occur in the central part of the new bone. In the later stages osteoclasts disappear, thus showing that the process can terminate.

Connective or Fibrous Tissue.—Mayer maintains that the proliferation of the connective tissue cells of the marrow causes the bone absorption. In the older portions of the new bone there is a great increase in connective tissue due to the multiplication of the cells of the enlarged perivascular lymph space. These cells fill the space between the central vessel and the bony wall. This fibrous marrow is transformed into coarse connective tissue and may give rise to cysts. Mayer states that the periosteum is very much thickened in the niche of the oval window.

Formation of Lamellæ.—The osteoid tissue has at first no lamellated structure; this only appears later on, and then the lamellæ are not arranged in a regular manner. The new osteoid tissue is, as a rule, sharply marked off from the normal bone by Pommer's cement line.

Is the Condition Inflammatory?—Opinions are divided on this point, but the onset of the disease with the formation of granulation tissue, the alternation between apposition, absorption, and renewed apposition, the formation of giant cells, all point to a chronic inflammatory process similar to osteitis fibrosa and Volkmann's vascular ostitis. The transformation of the cellular marrow into fibrous marrow, the ultimate production of solid compact bone, and the formation of exostosis are conditions which are found in chronic inflammations of other organs.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

May 7, 1915.

Dr. WILLIAM HILL, *President, in the Chair.*

Civil Cases.

Malignant Tumour at Base of Tongue almost dispersed by Radium.—**William Hill.**—Male, aged fifty-five; growth, size of a walnut, ulcerating posteriorly and with secondary involvement beneath the left angle of the jaw; left side of tongue fixed; occasional hæmorrhage; salivation; dysphagia; constant pain; insomnia. Insertion in two places of small, hollow, needle-like emanation apparatus of platinum 0.3 mm. thick, containing an initial charge equivalent to 40 mg. of RaBr., for twenty hours altogether. All symptoms have disappeared, and the tumour is so reduced that it might be easily overlooked on superficial examination. The secondary involvement will be dealt with before the date of meeting by an external application of screened radium salt. A water-colour drawing made by the patient, an artist by profession, of the original appearance with the mouth open was exhibited.

Case for Diagnosis.—**W. M. Mollison.**—G. B——, aged seventy-two, was sent to Guy's Hospital in November, 1914; he then had the appearance on the anterior pillars of fauces that he has now. The Wassermann reaction is negative, and, in spite of administration of mercury and potassium iodide, no change has taken place. The patient complains of pain on swallowing, severe at times.

Bent Nose straightened by Submucous Rotation of the Cartilaginous Septum.—**Dundas Grant.**—The nose pointed so far to the left as to be extremely conspicuous. The convexity of the deflection of the septum caused considerable obstruction of the right nasal passage. The nasal bones proper and the osseous septum were comparatively symmetrical.

The incision was made as for the submucous resection, but very close to the tip and on the side opposite to that to which the nose pointed. The cartilage was very carefully cleared, and was incised well forward. Killian's original plough was cautiously used so as to cut as much as possible of the curved cartilage, including the lower corner which pointed to the left. The wedge-shaped portion was cut as close as possible to the perpendicular plate and to the vomer, but not to the farthest extent, backwards, so as to leave a slight attachment posteriorly. It was then seized with flat forceps and rotated on its antero-posterior axis through half a circle in the direction contrary to the hands of a watch, so that the upper edge was to the right, and then downward to "six o'clock," where it was for the moment a little over-twisted. The part that originally pointed to the left now pointed to the right, and the lowest

part was now uppermost. Any "spring," therefore, tended to incline the cartilage to the right side. The incision was carefully sewn up, and well-vaselined plugs of cotton-wool were inserted.

The plugs were retained for two days and were then removed. The incision was uniting, and there was no tendency for the cartilage to push it open. The septum was then in a good position, and it appears to have healed well and adhered in its new position. The soft parts had still a slight cant to the left, being somewhat redundant on the right side and somewhat diminished on the left. The appearance of the nose was, however, so satisfactory that surgical interference was not further called for, and the lady did not feel inclined to be troubled even with the pads of a nose-machine. She applied strapping to fix the nose to the right side for a time.

N.B.—Dr. Grant thinks that, if he had a similar case to deal with again, he would make the incision on the side towards which the nose pointed, so that the spring of the cartilage should not exercise pressure on the sutured incision.

Nasopharyngeal Fibroma removed through the Mouth without any Preliminary Operation.—**Irwin Moore.**—This patient, a boy, aged sixteen, one of triplets, was shown at the last meeting of this Section on March 5. The growth was in an early stage and apparently similar to that exhibited by Mr. E. D. Davis on February 5 last. The chief symptoms were that six months ago he had to give up singing in a choir on account of difficulty in breathing and choking attacks at night. Occasionally streaks of bloods were coughed up, but there had been no spontaneous hæmorrhage. Marked heaviness and sleepiness, with great difficulty in getting him up in the mornings. He was supposed to be suffering from adenoids.

The growth and its attachments could not be seen from the anterior nares on account of a marked deviation of the septum with hypertrophic rhinitis. Resection of the septum was therefore performed a week previously. In removing the growth no preliminary operation of laryngotomy was performed, and the division of the palate was avoided. The anæsthetic was first given through Kuhn's oro-tracheal intubation apparatus, but it was found unnecessary and in the way. The hanging-head position, together with the free nasal channels, proved all that was necessary to keep the trachea free from blood. The soft palate was tied out of the way by a piece of soft rubber tubing passed through the nose and mouth. The growth was attacked and removed through the mouth. It was found to be sessile and attached by a broad fibrous base to the basi-sphenoid and occipital bones, with a prolongation extended, and firmly attached to the spheno-ethmoidal recess of the left naris. Great difficulty was experienced in detaching this root—nor was it possible to grasp and remove the growth by means of the usual post-nasal forceps until the root was fully detached. The manner in which the growth avoided the grasp of the forceps was very remarkable; its growth was very vascular, blood pouring out of the mouth and nose to an alarming extent during the later stages of the operation, but it ceased on detachment of the nasal prolongation.

Report by Dr. Fletcher on Section of Growth.—"The specimen was an irregularly rounded mass, of a red colour from extravasated blood, and of a hard consistency. It measured $1\frac{1}{2}$ in. by $1\frac{1}{4}$ in. in its longest diameter and 1 in. in its shortest. Sections have been taken from two different parts of it for histological examination. A few minute spicules of bone

were present (too small to be seen by the naked eye), and these unfortunately 'scored' the razor and prevented a *perfect* section being obtained. The growth is composed throughout of a dense fibrous tissue very rich in small and compressed spindle-shaped nuclei. In many places, however, the nuclei are stellate and suggest a tendency to myxomatous degeneration. The tumour is also extremely rich in large thin-walled blood-vessels quite devoid of a muscle coat. The edge of the tumour is well-defined, but presents here and there some little tags which suggest that possibly it has been enucleated from a capsule. Moreover, small areas in which some shrunken mucous glands are present support this view. I describe the growth as a vascular fibroma, but the possibility that it may be a fibrosarcoma cannot be excluded: indeed, the opinion has been expressed that it is a fibrosarcoma."

Growth in Maxillary Sinus extending into Nasopharynx.—**Irwin Moore.**—Male, aged forty-two, attended hospital on March 5, under Dr. Cathcart, who very kindly transferred the case to me. He complained of difficulty in breathing through the nose during the past twelve months, with considerable amount of watery discharge sometimes mixed with pus, occasionally slightly bloody on blowing nose. There is a history of syphilis twenty-five years ago.

On examination a large, irregular growth was seen originating from the right side of the nasopharynx, nearly filling that cavity, and extending through the right choana and middle meatus into the right maxillary sinus. A considerable amount of pus was seen in right fossa issuing from under the middle turbinal. A brawny swelling over the outer wall of the sinus involved a portion of the soft parts. The right maxillary sinus, on transillumination, was found to be very dark, and on being punctured the needle could be felt entering growth, and attempts to wash out failed. There was no bleeding on withdrawal of the needle. The swelling over the cheek increased considerably during the three following days.

Skiagrams show both antra somewhat opaque, but the right more so than the left, especially in the oblique views. The right sphenoidal sinus is very opaque, and also the ethmoid cells on the right side; these data being obtained by a comparison of the lateral with the anterior views.

On April 20 an opening was made through the canine fossa, and the antrum was found to be occupied by a growth extending across and filling the upper two thirds of the cavity, from the intranasal to the outer wall, which was necrosed, and infiltrating the cheek. Pieces removed from the growth for microscopical examination were of a soft consistence. There was little bleeding. A radium tube of 85 mg. strength and 1 mm. silver screening was inserted well into the growth and left *in situ* for twenty-four hours. There was very slight reaction and no rise of temperature.

Report by Dr. Fletcher on Section of Growth.—"This specimen is composed of organised fibrous tissue, not very rich in nuclei. It is somewhat cedematous, and is also infiltrated with small round cells, a fair proportion of which are polymorphonuclear leucocytes. Another feature is the presence of several blood-vessels which have thickened and hyaline walls; in my opinion the tissue is not neoplastic, but of a chronic inflammatory nature (? tertiary syphilitic). I cannot see any evidence that it is a sarcoma." Wassermann reaction is negative.

Further Notes on a Case of Malignant Stricture of the Œsophagus.¹—**Irwin Moore.**—The patient, a male, aged fifty-nine, formerly weighed 17 st. 7 lb. When first seen on September 18 he weighed 14 st. 12 lb., having lost 2 st. 9 lb. When shown before this Section on November 6 the tube through which he had been able to take 9 pints of food daily had been in position for seven weeks, and the patient had gained 6 lb. The tube was removed on that date, but required re-insertion nine days later on account of temporary obstruction. During this period patient was able to swallow milk, beef-tea, and bread and milk with very little difficulty. The original tube has now been *in situ* nearly six months.

The patient writes a cheerful letter, and reports as follows: "The tube is giving every satisfaction. I am still taking about 8 pints of food daily, consisting of beef-tea, junkets, light-boiled eggs, custard, Benger's food. I look well, but I feel a little weak at times, and cannot stand much fatigue."

Recurrent Columnar-celled Carcinoma of the Antrum.—**W. Stuart-Low.**—A man who has been shown previously on two occasions after operations two years ago on the left maxillary antrum for the removal of a columnar-celled epithelioma. There was a recurrence six months after the first operation, and a very thorough second operation was performed eighteen months ago. The growth has now recurred in the ethmoidal region, and the cavity of the orbit has become invaded. Diathermic puncture has been applied with good results in diminishing the size of the mass in the nasal cavity.

Microscopic Specimen and Pathological Report by Dr. Wyatt Wingrave.
—"The growth is of the columnar or 'palisade' cell type, merging into the alveolar, most of the cells resembling the normal surface epithelium of the region, but devoid of cilia. They are arranged on a fimbriated and branching framework of fibrovascular tissue which forms the stroma. It therefore consists of epi- and meso-blastic elements suggestive of adenoma. In some parts the cells only form a single layer, but for the most part they are closely packed, the villous type changing to the alveolar and original features lost. Many of the nuclei exhibit heteromitotic division. The tumour therefore presents a striking resemblance to malignant polypus, or tubular epithelioma of the lower bowel, and to villous growths of the bladder and uterus. When differentially stained by mucicarmine or Pappenheim, heteroplastic characters are well shown. While normal and adenomatous tissues show mucigen granules and 'chalice cells,' their neoplasm shows none. Structure is therefore imitated, but not function. This type of neoplasm is by no means rare in the nose, for it has constituted 40 per cent. of malignant cases in that region, but it is very rare as a primary growth in the pharynx and larynx. In the mouth it has not been recorded. It is usually associated with, or may start from, the region of the ostium maxillare. Growth is rapid, consistence is very soft and brittle, it bleeds freely, and although locally malignant is but rarely found as a secondary deposit in glands. The true significance of the tumour is difficult to establish when a small fragment only is supplied for examination, therefore an adequate mass is usually necessary for diagnostic purposes."

New Growth in Post-nasal Space.—**Frederick Spicer.**—Female, aged seventy, married. Patient was brought to hospital on February 9

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., March, 1915, p. 129.

last, complaining of inability to breathe through the nose, deafness, and rapid wasting. She was very feeble, had to be assisted in walking, and was breathing through open mouth, from which saliva was dribbling. A quantity of foetid muco-pus was being continually discharged from the nostrils. She appeared seriously ill.

On examination, the nasal fossæ were found to be blocked with prolongations of a growth situated in the post-nasal space. The growth was easily seen from the mouth by lifting up the soft palate. It was greyish in colour, and the surface rough and cauliflower-like in appearance, growing from the vault, not particularly hard, and bleeding on examination.

Under simple cleansing treatment a great improvement in her condition took place and the size of the tumour diminished.

Pathological Report (Dr. Leatham).—"Section shows lymphoid tissue covered with squamous epithelium."

Halfpenny embedded in Œsophagus.—**W. H. Jewell.**—Child, aged twenty-two months. There was a history of its having swallowed a coin ten days before admission to hospital. Death occurred on the thirteenth day after the accident, with perforations of the right and left sides of the gullet. There was occasional sickness after food during the first five days, but afterwards there was no return of food. No dyspnoea. The œsophagoscope was passed with the aid of the fluorescent screen, and the coin located just below the sterno-clavicular articulation embedded in the posterior wall of the œsophagus. The circumference of the coin and four-fifths of its anterior surface was covered with mucous membrane, making it impossible to apply forceps or hook or to dislocate it from its bed.

Pharyngeal Fistula in an old Man after Operation on Abscess in the Neck.—**W. Douglas Harmer.**—Male, aged eighty, admitted to St. Bartholomew's Hospital under the care of Mr. H. W. Wilson. On March 17 operation for the removal of the prostate. This was well tolerated, and the patient made good progress until April 10, when the left side of the neck suddenly became inflamed and a swelling appeared, apparently connected with a gland. Four days later a definite abscess had formed and was incised. On April 24 paralysis of the soft palate, with regurgitation of fluid through the nose, was first noticed. Soon afterwards it was found that, when taking his meals, food passed from the mouth through the wound in the neck, and as the abscess was not draining well, the opening in the neck was enlarged on April 28. There are now two clean-cut openings in the pharynx: (1) in the middle of the left tonsil; (2) near its upper pole. The wound in the neck and the supra-pubic incision are both healing very sluggishly.

Warfare Injuries and Neuroses.

The PRESIDENT suggested the grouping of subjects and cases for discussion as follows: (1) Introductory paper by Majors Milligan and Westmacott; (2) functional cases; (3) injuries of the upper face, involving the palate, nose, and sinuses, and injuries of the lower face, involving the mouth, fauces, mandibular and submandibular regions; (4) injuries of the neck, involving the lower pharynx, larynx, trachea, and gullet.

Introductory Paper by Major Sir William Milligan, M.D., and Major F. H. Westmacott, F.R.C.S.¹

Group I.—Functional Cases.

Functional Aphonia (one including **Functional Deafness**) following the **Bursting of a Shell in close Proximity to the Patient.**—**Herbert Tilley.**—The first case was that of a man near whom a shell had burst on November 5, and from this time he had been aphonic till December 11. The second case had been buried by a "Jack Johnson" for four hours, and when he was dug out his voice had gone and he was also deaf. He remained thus for three months, and was sent into the hospital. In neither patient could any other disease be found, and inquiry showed that the voice was strong before the accidents. The first got well in response to a moderate intra-laryngeal faradic shock. But in the case of the second, even a strong faradic shock did not restore phonation. As the patient refused to open his mouth, the laryngeal electrode was passed through the left nasal cavity into the larynx and the current passed until the resulting spasm induced marked cyanosis. On removal of the electrode the patient's voice returned, and he spoke for the first time for three months. The hearing also was restored. These faculties have not since been lost, but his general condition may be described as that of profound neurasthenia.

Gunshot Wound of the Neck with Laryngeal Symptoms for Diagnosis and Opinions as to Treatment.—**Coubro Potter.**—Male, aged twenty-four, came suffering from complete aphonia. On September 14, 1914, at Plassy, he was hit over the head with a rifle, causing concussion of the brain. He was sent home to hospital, recovered, and returned to the front, where, during a night attack on February 17, 1915, he was shot in the neck. The bullet entered $1\frac{1}{2}$ in. below the lobe of left ear and came out about 2 in. from symphysis menti on right side. The patient intimates that from this date he could not speak. Previous history good.

On examination I found that the patient had left-sided paralysis of the cervical branches of his facial nerve, producing drooping of the angle of the mouth. He also had left unilateral paralysis of the hypoglossal nerve, which caused deviation and twisting of the tongue. Laryngoscopic examination was very difficult at first, owing to overhanging of the epiglottis and the nervousness of the patient. The true vocal cords did not approximate on phonation, nor did they move during breathing, but the arytaenoids approximated during phonation. Subsequent examination gave a very much better view of the vocal cords, and at times the cords during phonation gave the impression of a certain range of movement. Nothing else of importance was noted except a slight amount of anaesthesia of the left side of the soft palate.

The PRESIDENT said that in Dr. Coubro Potter's case there were definite organic lesions of the hypoglossal nerve, the facial, and the superior laryngeal; and he was rather inclined to favour the view that the man's aphonia was also traumatic and not purely functional. A further report would be desirable at the next meeting.

Functional Aphonia.—**J. F. O'Malley.**—Six cases of this condition have come under my care, all having occurred in the trenches. In four

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., August, 1915, p. 297.

the voice returned on asking the patient to phonate with the laryngeal mirror *in situ* for the purpose of examination, and a mild application of the faradic current was effective in the other two.

Functional Aphonia.—**H. L. Whale.**—No. 11,335: Sudden aphonia in trenches without any injury. Perfect movement of cords, but in adduction he ceases to expire. Sudden recovery from neurosis in twenty-four hours.

DISCUSSION ON FUNCTIONAL CASES.

Sir FELIX SEMON desired to make brief reference to the case shown by Dr. Conbro Potter, which appeared to him to be extremely interesting and obscure. He was far from saying anything dogmatic about it, and only gave his impressions. He believed it to be a functional case, and for the following reasons: First, the entrance wound was very close to the left pneumogastric nerve, and the wound of exit was on the opposite side very much more in front. There was, however, no isolated paralysis of the left vocal cords. After a good deal of coaxing, the patient would haltingly say a few words in a whispering voice, a fact which was very suspicious, because if a man were merely aphonic from an organic lesion he would answer in a whispering voice questions put to him, but he would unhesitatingly answer. He did not by any means wish to say that the patient was malingering, but even now—though some months had elapsed since the injury—he gave a sort of stupefied response, as if unable to fully grasp what was being said to him. With this delayed response there was uncertainty in his movements. When he (Sir Felix Semon) examined the pharyngeal reflexes and asked the patient to lift his finger on the side touched, there was always a definite delay in the response. But the decisive factor in his belief was that there was *equally defective* movement in *both* vocal cords. If there had been actual injury to the left pneumogastric nerve, he would have expected to see complete paralysis of the left cord, or defective movement of it, in marked contrast to the condition on the other side. When there was an attempt to phonate, members would agree that the cords almost touched in the midline. Those facts, together with the general psychological attitude of the man, induced him to regard the case as functional.

Sir STCLAIR THOMSON said a striking feature of modern warfare was the number of functional cases which were freely reported and met with all over the country. In the old Laryngological Society, after the Boer War, someone showed a case of functional aphonia, and it was looked upon almost as a curiosity in a man; and that case was freely quoted, and he even mentioned it in his book. At the King's Sanatorium, at Midhurst, part of which was being given up to soldiers, the war would bring a large harvest of cases of tuberculosis amongst soldiers. Among the cases there now were three hearty-looking Grenadier Guardsmen, who were brought for his inspection as cases of tuberculosis of the larynx; each had functional aphonia, and the interesting point was that they had phthisis in the lungs. It was well to be warned, and not dismiss these cases of aphonia as merely functional; they must be examined for tubercular disease. One of these cases had functional dysphagia. They had been wounded in the retreat, and one had nourished himself with slops for four months, and talked in a very low whisper all the time. The functional aphonia was cured by suggestion.

Sir WILLIAM MILLIGAN said that on examining the case under discussion he had made up his mind it was functional; it was similar to a number of cases which he had been seeing for months. He agreed with Sir Felix Semon as to the man's slowness of response, which was an important, though not necessarily a diagnostic, factor. He could remember three cases in which there was a previous history of laryngitis, and where there were the remains of catarrhal laryngitis at the same time as this condition of so-called functional aphonia existed. He also supported Sir StClair Thomson's warning about not overlooking any tubercular element. He had only seen one example of this class of case with undoubted tubercle of both vocal cords, and a suspicion of chest tuberculosis. The functional element might well be engrafted on an organic basis.

Mr. TILLEY said that with regard to Dr. Potter's case, he was convinced that it was a functional loss of voice, because the patient was able to adduct the cord when saying "E."

Mr. W. D. HARMER said he had seen several cases of this kind at the 1st London General Hospital. Two impressed him considerably; one was that of a Guardsman who was sent to France, and arrived near to the firing line, and then seemed to have been thoroughly scared. He developed functional aphonia, and was sent home. The other man was wounded just beneath the jaw by a bullet which passed from one side of the neck to the other, and he came back wearing a tracheotomy tube, which was soon removed. He had no paralysis of any nerves, and the wound healed rapidly. Both cases were treated with the greatest care, and for long periods, but without improvement of the voice.

Dr. DUNDAS GRANT wished to draw attention to the important remarks of Dr. Moure, of Bordeaux, who had had a large field for the study of the disorders arising from warfare. Dr. Moure said that "the men most often affected by bad weather or by the noise at the Front had almost always old auricular trouble, or present nasal or nasopharyngeal disability." This had also been very striking in the few cases which had come under Dr. Grant's own notice. He had under his care a young lieutenant with extreme neurotic disturbance and dreams amounting to most formidable nightmare. He had enlarged tonsils and a mass of adenoids. As soon as they were removed he improved with great rapidity. Another case was one of extreme deafness, but that was not in order to discuss here. When he was at Bordeaux he saw several cases of suddenly acquired deaf mutism, which seemed to answer to no other treatment except re-education. Some of them reacted very quickly to the slightest stimulation, but others had too profound a disturbance of the synapses. A gentleman was most patiently carrying out this re-education in Bordeaux, and Dr. Grant thought such treatment might be necessary in this country.

Mr. STUART-LOW said that he had had a number of cases of loss of voice in soldiers, most of whom were about to be sent to the Front, but others had experienced this after being in the trenches. In nearly every instance there were anatomical disturbances in the nose and throat—deviated septum, enlarged tonsils, adenoids, etc.—and on these being operated upon the voice soon recovered. Mr. Stuart-Low had always made it a feature of his teaching that electric treatment should not be undertaken in functional aphonia until gross obstructive conditions in the nose and throat had been removed by operation.

Mr. E. D. DAVIS said that two out of six cases he had seen were the subjects of functional aphonia grafted on to acute laryngitis, about which

there could be no doubt. The aphonia persisted. In another type of case there was paralysis of the arytaenoides, and this seemed to be the most difficult to cure.

Dr. P. WATSON-WILLIAMS said it was very important to differentiate between true functional cases and those which were pseudo-functional and really due to organic mischief and weakness. A typical case, showing the influence of the nose condition on the larynx, was that of a soldier who for ten weeks had "functional" aphonia, and was brought to the speaker in consultation with a view to intra-laryngeal faradisation. He explored the man's antrum, and found he had a latent antral infection with tenacious purulent secretion. This was washed out, and within two days the "functional" aphonia had disappeared. Many cases suspected to be purely functional, but which on investigation were found to be associated with incipient pulmonary tuberculosis, came into the same category.

The PRESIDENT expressed his agreement with Dr. Watson-Williams's remarks. Care should be exercised as to labelling as functional a condition which was a sequel of an organic lesion; there might be some arthritis or myositis remaining. These cases came up *apropos* the war, and it was irresistible not to think of two elements: one was shock, fright and concussion due to the war, and the other was malingering. These elements must be borne in mind in almost every case.

Dr. COUBRO POTTER, in reply, expressed his gratitude to members for giving their opinion on his case. Though he had examined the man a good number of times, he was still unable to make up his mind as to whether it was functional or organic. At first he thought there was injury to one of the nerves, possibly the superior laryngeal; but that day he certainly moved his cords better and showed his larynx better too. But that might be because the many examinations had taught him to make his best effort.

Group II.—Injuries of Neck involving Larynx, Trachea, etc.

Laryngeal Stenosis following a Bayonet Wound treated by Intubation.—E. D. DAVIS.—Private J—, who was wounded in the shoulder, received a second bayonet thrust in the larynx on October 13, 1914, and was taken prisoner. The lower third of the thyroid cartilage was apparently destroyed, and the Germans inserted a large tracheotomy tube on December 4.

When seen at Millbank on March 3, 1915, he was wearing a large curved cannula inserted through the larynx with an upward extension of $\frac{3}{4}$ in. (the cannula is shown). He could neither speak nor breathe through the mouth. He had to write everything down to make himself understood.

At an operation on March 5 a high tracheotomy was performed and the thyroid cartilage was exposed. The cannula was removed and its extension was found to be buried in scar tissue. The cavity of the larynx was discovered by passing an intubation tube from above. The alæ of the thyroid cartilage were separated by $\frac{1}{2}$ in. of scar tissue at least $\frac{1}{4}$ in. thick. A large gap about 1 in. wide existed between the larynx and the upper end of the trachea, in which the posterior wall of the trachea and larynx alone remained. A rubber drainage-tube was inserted from the tracheotomy tube below to the orifice of the larynx above, and the wound closed as far as possible, with the exception of the gap produced

by the old cannula. The rubber tube was replaced later on by the intubation tube fixed by the midwifery forceps clip through the lower tracheotomy wound. The intubation tube and clip were described by Mr. Barwell in the *Lancet* on January 2, 1915 (a pattern is shown).

When the drainage tube was in position no difficulty was experienced in swallowing, but after the insertion of the intubation tube the fluids made the patient cough.

The patient, who speaks well in a loud whisper, and the various tubes, were shown.

Paralysis of the Left Vocal Cord.—J. F. O'Malley.—CASE 1.—Private D——, aged twenty-three, returned from France in December, 1914, with slight shrapnel wounds of neck and head. On February 26, 1915, he came under my care with a history of having recently rejoined his unit, and being compelled during a route march to fall out, owing to dyspnœa, after walking a mile. He was voiceless for a fortnight following the injury, but speech returned and appeared to be quite normal since then. The healed scar of the skin wound in the neck was situated slightly to the left of the middle line, and opposite the upper border of the cricoid cartilage. The left vocal cord and arytenoid were immobile in the cadaveric position, indicating left recurrent laryngeal paralysis. The X-ray plate shows a piece of shrapnel which traversed the larynx and presumably injured the left recurrent laryngeal nerve. As dyspnœa is not a usual symptom of one-sided paralysis—although I have seen some cases in which it became marked on exertion—he was submitted to a very careful screen examination of the thorax by the X rays for a possible injury of the vagus or phrenic nerves, or other organic lesion. When at rest the heart-beats and vessels appeared normal, but the right half of the diaphragm moved sluggishly. He was then asked to run up and down the hospital corridor until a feeling of dyspnœa was forthcoming, and he was then re-examined by the X-ray screen. The heart still beat regularly but more rapidly, and the right half of diaphragm became active, both indicating stimulation, response, and full nerve control. The only unusual condition discovered was some enlargement of the bronchial glands. He has been invalided from the Army.

CASE 2.—Private S——, aged twenty-seven. This case, although arising under conditions of warfare, cannot be strictly classed as a warfare injury, such as those due to shot or shell, but is one of some special interest, and is therefore included. He lost his voice in the trenches in France, and was invalided home. He had no previous attack, and had no cold at the time of onset. On examination his left vocal cord was found to be in the cadaveric position, and he could only speak in a whisper. There was no injury to account for the condition. An X-ray examination disclosed a small aneurysm of the aortic arch. The history of onset in this case is interesting in view of the fact that several cases of purely functional aphonia occur during the exciting stress of trench warfare. When contrasted with the previous case some noticeable points of difference arise in the symptoms. In both cases there was a lesion of the left recurrent nerve, followed by paralysis, the lesion being immediately followed by aphonia, which persists in the case of aneurysm but not in the case of injury, whilst the latter has, in addition, dyspnœa on exertion.

Traumatic Fixation of both Vocal Cords.—J. F. O'Malley.—Private V. W——. A shrapnel bullet entered at the lower border of the

right inferior maxilla and traversed the neck from right to left; it was finally removed from the left supra-clavicular triangle. Aphonia was present from the date of injury. There was no history of hæmorrhage, dyspnœa, or dysphagia. On examination the cords were found to be slightly more adducted than in the cadaveric position, and this was observed on several occasions and was maintained throughout forced attempts at deep inspiration and phonation. No wound or adhesion was discovered in the larynx. This patient is now on furlough.

Injury to Larynx by a Horse's Kick.—**W. Stuart-Low.**—A driver in the Royal Field Artillery was kicked by a horse on the right side of the neck. At the time of the injury, and for some days after, he complained of pain in the larynx. He subsequently became very hoarse, and sometimes had great difficulty in speaking at all; this continued for a month, when he was sent to the hospital. The entrance to the larynx was found to be very congested and somewhat swollen, but felt quite soft when palpated with the finger through the mouth. The vocal cords were seen to be moved normally, but were very congested. Dry-cupping was applied over the crico-arytænoid and thyro-hyoid spaces on both sides of the larynx simultaneously. The vocal cords and entrance to the larynx could be seen in the laryngeal mirror to become quite pale, and the swelling lessened under the action of the suction. The voice at once improved, and, after a few applications, in the course of a few days returned to normal.

Shell Wound of Neck.—**William Hill.**—Private X—, who suffered from marked dysphonia, was seen on January 21 at Torquay Red Cross Hospital. A fragment of shell had passed transversely across the neck two months previously; wound at entrance and exit healed; thickening of alæ of thyroid cartilage and of soft tissues superficial to larynx. When first wounded he had coughed up blood. Mirror examination showed a tumour-like mass, mostly above and to the right of the anterior commissure, in the region of attachment of left ventricular band to the right ala of the thyroid cartilage: the latter had probably been fractured by the fragment in its passage transversely through the neck. A similar injury was reported at the February meeting of the Section by Mr. Buckland Jones.

Tracheal Obstruction due to long latent Cervical Abscess following Shrapnel Fragment Wound.—**William Hill.**—Captain S— was wounded in October by a fragment of shell passing transversely through the neck. On arrival at Torquay about December 20 the wound of entry and exit had healed, but the patient had an up-and-down temperature and a recrudescence of pneumonia. There was evident narrowing of the trachea with expiratory stridor. When examined by Mr. Worthington on December 24 there was no laryngeal paralysis; though the tracheal narrowing caused stridor there was fair entry of air, and in view of the patient's weak and critical condition from pneumonia it was considered that tracheotomy would merely ensure a fatal result. The possibility of deep abscess either in the neck or in the mediastinum was considered, but there was no positive physical evidence of a cervical abscess. On January 20 I was asked to visit the patient, but before my arrival at Torquay a tracheotomy had to be hurriedly performed during the night by Dr. Payne for the relief of serious increase of dyspnœa. On incising the trachea a large intramural abscess (in the lateral wall of

the trachea) under tension was struck; a Fuller's bivalve cannula was inserted. When I examined the patient two days later he was breathing easily through the cannula, but complained that it caused pain. I found that a Durham cannula was quite comfortably borne on account of its length being better adapted for a case in which the tissues of the neck superficial to the trachea were considerably tumefied. It was found that although the abscess had been evacuated, stridor returned on removing the cannula. The stridor, however, was now *inspiratory*, and on mirror examination there was seen well-marked abductor paralysis on the same side as the abscess; this latter was not observed when an examination was made by a laryngologist one month before. The patient's condition was not such as to warrant my making an endoscopic examination. By coincidence this patient was shown at the meeting by Sir StClair Thomson, see below.]

Case of an Officer shot through the Larynx.—Sir StClair Thomson.—The injury resulted in complete stenosis, requiring tracheotomy. Restoration of the lumen of the larynx was effected. The patient is still under treatment with intubation tubes.

DISCUSSION ON INJURIES OF NECK INVOLVING LARYNX, TRACHEA, ETC.

The PRESIDENT, referring to this case, said he had previously seen the patient, and he thought the abscess was due to traumatic perichondritis and a necrosed tracheal cartilage, which was relieved directly tracheotomy was done. The abscess had been lying latent. The inflammatory thickening was now higher up than his notes led him to believe when he examined the case in January, and at that time there was no laryngeal paralysis, though there was now distinct loss of movement in one cord. In his other case the ala of the thyroid was fractured. A similar one was shown at a previous meeting by Mr. Buckland Jones, which, like this one, presented the appearance of a growth.

SIR STCLAIR THOMSON said he was not aware that the President had been connected with the case he (the speaker) had shown. These cases of stenosis of the larynx were very tiresome to treat. When this officer came, he had what seemed to be a web immediately below his vocal cords. One cord was more or less fixed, the other moved; but there was complete stenosis, and the patient breathed entirely through the tracheotomy tube. The history showed how the condition had spread up from the trachea into the larynx and subglottic tissue. It showed the wisdom of doing tracheotomy low down. High tracheotomy should be ruled out, except in cases of urgency. In this case there was a difficulty in finding a thoroughfare, but under direct laryngoscopy a passage was obtained. There was fair dilatation except at the last part. This dilatation was being attempted by long intubation tubes, suggested by Rogers, and used in this country by Barwell and E. D. Davis. As long as there was a tracheotomy tube in, the man bore his intubation tube quite well, but to dilate the last part the tracheotomy tube had to come out. He would be glad of suggestions as to whether the process could be persevered with, and as to methods of securing it by clamps, as described in the *Lancet* by Mr. Barwell early this year.

The PRESIDENT said that in this case he did not do the tracheotomy: it was done before he could get to Torquay. He could not say positively it was an intramural tracheal abscess. He gathered that Dr. Payne did

not consider until he cut down that there was an abscess present in the trachea or elsewhere in the neck. He (Dr. Hill) imagined that the cartilage had necrosed, therefore it was likely that the cricoid was also involved in the abscess and in the perichondritis. The difficulties of making a diagnosis in such a case were very great without doing a tracheoscopic examination, and the patient's condition at the time contra-indicated that procedure.

Mr. HOPE said that apparently the reason the patient had the long tube out was that he began to get frightened; he wanted to cough, and thought that if he did he would cough the tube out; it was not that he had not enough air. He considered there was a difficulty in getting the clamps on. In the President's case it was a rubber tube, which kept the fibrous stricture open very well, and such might be of use to this patient.

Mr. HARMER said that he was now treating two similar cases with Schimmelbusch tubes, and both were doing well. The only difficulty was to get the upper segment of the right length, this requiring careful measurement in each case. The two portions were introduced separately, and afterwards fixed together by a screw. For cleaning it was only necessary to unscrew the cap and clean the outer part of the tube, as the inner portions were often free from mucus. The tubes were made of silver, and in some instances could be worn for a month without changing.

Dr. DUNDAS GRANT said that Thost, of Hamburg, had devised some ingenious plugs, which were adapted for introduction above the upper part of the tracheotomy tube; they were solid. He saw Dr. Moure using a very simple arrangement, namely, a thick piece of drainage-tube with a hole cut in the side, through which the tracheotomy tube was passed. The continuation upwards had the pliability of the india-rubber. Dr. Moure had five cases of laryngostomy since the war began. At the first stage of the operation he plugged with a "basket" of gauze, the whole smeared with oxide of zinc in vaseline 1 in 15. It was very easy to remove in two or three days, and later it was replaced by the tube above described. The softness of the rubber enabled the other part to be coaxed up into the larynx after the lower part was introduced with the tracheotomy cannula.

Dr. P. WATSON-WILLIAMS understood, from StClair Thomson's remarks, that in this case a high tracheotomy was performed, and asked why he recommended a low tracheotomy in such cases. A tracheotomy at the seat of the abscess seemed to favour drainage of the suppurating tissues, and rather helped manipulations in the constricted part of the larynx. His own experience was that vulcanite or metal instruments did not excite so much local reaction as india-rubber tubes, and he had not been favourably impressed with the use of rubber in inflammatory stenosis.

Mr. E. D. DAVIS said he had struggled with such a case at Millbank for two months. The man was wearing an intubation tube with Delavan's clip through a high tracheotomy. At first swallowing was difficult, because fluids entered the intubation tube. Since the tube was altered, the man swallowed much better. The clip was applied in the same way as midwifery forceps, first one blade, and then the other, through a large aural speculum. The man had had a huge German tracheotomy tube (shown) inserted into the larynx, and an extension tube projected upwards into the thyroid cartilage, but it went into scar tissue, not into the lumen of the larynx. The man could not then speak, but now he

was wearing the intubation tube he spoke in a loud whisper, and was doing very well.

Mr. HOPE asked whether members would give their experiences with the large vulcanite intubation tubes. Several were sent down of enormous sizes, but on trying to use them the patients got perichondritis and fixation of the cord, with pain in the larynx.

The PRESIDENT said he had one such tube as Mr. Hope mentioned, but he lacked the courage to use it.

Sir STCLAIRE THOMSON, replying to Dr. Watson-Williams, said this tracheotomy was excellently performed, and it was a low tracheotomy. This case showed the importance of doing a tracheotomy lower than was usual in all inflammatory conditions. When Dr. Hill saw it the larynx was clear, but when he (the speaker) saw it the cicatricial tissue was spreading up to below the cords. There was a great tendency for inflammatory tissue to contract in the subglottic region.

The PRESIDENT said the remarkable point about the case was that the abscess was latent for two or three months, and, when seen by Mr. Worthington, of Exeter, a month before the speaker saw him, the former said he concluded there was no definite evidence of abscess. The reason was that the tissues were so brawny after these wounds, even when they had healed up, and the patient being ill with pneumonia and looking as if he would not stand an operation, it was a difficult matter to advise exploring on the chance of finding a latent abscess. There was, however, such a latent abscess in this case, and the patient nearly died as the result of its not being diagnosed and dealt with more promptly.

Group III.—Injuries to the Vertex, Face, Jaws, Nasal Cavities, etc.

Bullet Wound in the Head.—J. F. O'Malley.—E. H.—, a Belgian soldier, aged thirty. A bullet entered the vertex to the left of the middle line, about 1 in. in front of the surface marking for the fissure of Rolando, apparently traversing the left half of the brain and found exit from the skull by passing through the body of the sphenoid. It entered the nose by the roof of the left posterior nares, passed through the middle turbinate and inferior meatal floor, slightly injuring the inferior turbinate. It finally passed through the anterior part of the hard palate and floor of the mouth, the wound of exit being situated in the neck to the left of the symphysis menti and behind the horizontal ramus of the lower jaw. He came under my care several weeks after the injury and looked extremely blanched. There was a history of several recurrences of bleeding, which were at times immediately arrested by inserting gauze, soaked in adrenalin, for about 2 in. inside the left nasal fossa. At other times this packing was not effective, and slight oozing continued for hours. On examination, an adhesion of the left inferior turbinate to the meatal floor was seen, with a granulation area on the latter, which bled easily, but not profusely, when touched with a probe. On posterior rhinoscopy a ragged wound could be seen in the roof of the posterior nares, which I now believe was the source of much of the hæmorrhage. A post-nasal plug of gauze, squeezed out of adrenalin, was inserted against the posterior wound, and held in position by a stout silk thread passing through the nose, the latter being fixed externally to a piece of rubber tubing. This plug was left *in situ* for twenty-four hours. The bleeding ceased immediately and has not since recurred. His left

antrum was dark on transillumination, and an X-ray examination showed opacity of this cavity together with that of the lower ethmoidal region (plate shown). The antrum was punctured and washed out, but the fluid returned quite clear. Organised blood-clot was probably the cause of the opacity. Lieut. Kiep, who examined his eyes, reported primary optic atrophy on the left side, with complete loss of vision. The bullet had apparently injured the optic nerve in its passage through the sphenoid. After the arrest of hæmorrhage he improved rapidly in colour and weight, and has now rejoined his regiment in the fighting line in Flanders.

Intranasal Adhesions.—**J. F. O'Malley.**—CASE 1.—Lieut. M——. Some pieces of shrapnel entered below the patient's left eye, traversed the upper part of the left antrum, left and right nasal passages and septum, and lodged in the right pterygoid region, where they still remain. The left inferior turbinate had formed extensive adhesions to the septum, whilst a similar but less severe condition existed on the right side. The septum was markedly deviated to the left side, which, in my opinion, was a large factor in predisposing to the formation of the more extensive adhesion. I have noticed this influence in other cases also. On blowing the nose, he complained of air rushing into his left eye. The conjunctiva was injected. An X-ray examination showed opacity of the left antrum and destruction of the tip of the right coronoid process. The adhesions in the nasal fossa were divided, but rapidly re-formed on the left side, although rubber splints were used for six days. They were finally cured by means of a submucous resection. The antrum was punctured and found free from pus, organised blood-clot being the probable cause of the opacity to X rays and transillumination. The nose has healed perfectly, the eye symptoms have disappeared, and no further trouble is experienced in the lacrymal duct.

CASE 2.—Lieut. P——. A bullet had entered the anterior half of the left eye and side of the nose, leaving a large stellate wound of exit below the inner canthus of the right eye. The latter was untouched, but the left eye was destroyed. As he reached hospital on the third day after injury, the intranasal œdema was still very marked and was allowed to subside, to ascertain the degree of permanent obstruction, before any attempt was made to look for or treat adhesions. After a fortnight the swelling subsided and the left passage was quite free, but an adhesion had formed in the right, above the inferior turbinate. This was removed by a punch forceps, which appears to me to be better than scissors in these cases, and there was no further trouble.

If no bones are displaced or no marked external deformity exists, calling for some immediate operative interference, I believe it to be sound practice to treat injuries of the nose on an expectant plan, although marked nasal obstruction may exist in the early stage. This obstruction is chiefly traumatic œdema, and will subside if no manipulations are permitted. I have had several cases of severe nasal injuries due to falls off horses and kicks from them in young soldiers learning to ride, and have come to the conclusion that the less interference in such injuries the better.

Bullet in Pterygoid Region of Skull.—**Walter Howarth.**—This case was not seen until eight weeks after the injury. At that time there was a purulent discharge from both nostrils with almost complete nasal

obstruction and considerable swelling in the right parotid region. The chief disability was that the mouth could not be opened wider than 1 in., and that there was much pain in the region of the right temporo-maxillary joint. The point of entry of the bullet was in the cheek just above the left canine fossa. The left antrum was found to be disorganised and suppurating, and there were several adhesions between the outer wall of the nose and the septum. There was a ragged hole in the septum and in the nasal wall of the right antrum, which was also suppurating. At the first operation both antra were drained and several fragments of lead removed from the septum and right antrum; a large portion of the anterior wall of the right antrum was removed, but the bullet itself could not be reached by this route. The skiagram showed it as an horseshoe-shaped mass internal to the right temporo-maxillary joint and close up to the base of the skull. When the antral suppuration had subsided, the bullet was extracted by the external route. For this purpose a curved incision was made over the temporo-maxillary joint towards the external angular process, a portion of the zygoma was removed and the temporal muscle retracted forwards. The exploration was then continued through the sigmoid notch until the bullet was reached and removed. The conical point of the bullet was intact, but at the posterior end the casing was split and the lead mushroomed out and bent round. Recovery was uninterrupted, and in a few weeks the power to open the jaws widely was regained.

Gunshot Wound through the Cartilaginous part of the Nose.
—**Sir StClair Thomson.**—This injury led to almost complete occlusion; the airway was restored by submucous resection and division of adhesions.

Injury principally to Lower Face and Mandible.—**H. L. Whale.**—Special attention is drawn to a few remarkable cases.

No. 6801.—A man was shot through the neck in front of the sternomastoid, the bullet emerging on the opposite side of the face. It missed the internal carotid, although it tore the tonsil away.

No. 6317.—In another case, of which he showed the skiagram, the premaxilla was blown out, and now stuck out like a rabbit's jaw. It went back well, and stayed back, as shown by the second skiagram, taken after operation.

He had five cases of wounds from the nose down to the thyroid region, of varying severity.

One was open from the columella nasi to the thyroid. The lower part of the face and upper part of the neck were turned outwards like an open door, and the wound was large enough to admit the hand. The patient died in twelve days.

Another had a vertical wound from the inner canthus, through the antrum, into the mouth, so that it was possible to look directly into the sphenomaxillary fossa. It healed up, as most of them did after plastic operations.

In one case two incisor teeth were buried between the alveolus and the soft tissues of the chin. In another case a piece of jaw 3 in. long was turned completely round, so that the contained teeth pointed downwards.

In another case, which recovered with partial speech and fair swallowing-power, the jaw was so comminuted that both rami, from angle to angle, had to be removed.

The following notes are a brief synopsis of the cases in order :

No. 978.—Bullet wound transversely through extreme posterior part of both antra. Practically no symptoms. Septum, ethmoid and sphenoid were all untouched owing to the slightly varying inclination of the vomer; this is only possible in certain skulls, not in all.

No. (?).—Vertical shrapnel wound from mouth to thyroid cartilage. Thirty-hour journey to base in train, during which time he fed himself through self-passed rubber tube. Recovery.

No. 7451.—Vertical shrapnel wound from mouth to hyoid bone. Extensive comminution of lower jaw. Plastic operation; drainage. Good result.

No. 298.—Both eyes destroyed by transverse shrapnel wound. Operation: Both ethmoids cleared out through double eyebrow incisions. Sent home well, but blind.

No. 6801.—Bullet wound: Entrance posterior border of left sternomastoid, 4 in. below lobule of ear; exit just above the angle of right lower jaw. Left tonsil partly torn away. Internal carotid artery untouched. Practically no symptoms.

No. 2773.—Shrapnel wound of left antrum; tetanus. Treatment: Subcutaneous injection of serum, large subcutaneous doses of 2 per cent. carbolic acid, and wound dressed with brine. Latent period was fourteen days. Recovery.

No. 7828.—Screw-top of time-fuse impacted in floor of nose. Removed by reflecting muco-periosteum from hard palate. Good healing.

No. 7746.—Shrapnel. Enormous gaping wound from columella nasi to thyroid cartilage; upper and lower jaws comminuted; recurrent hæmorrhage from left coronary artery. Fed through tube. Lived until the thirteenth day.

No. 6317.—Dislocation of premaxilla by bullet. Replaced (*vide* skiagram).

No. 5120.—Shrapnel wound of right antrum, making it possible to look directly into sphenomaxillary fossa. Plastic operation. Home with very ugly scar.

DISCUSSION ON INJURIES TO HEAD, FACE, NOSE, AND JAWS.

MR. ANDREW WYLIE remarked that neither Sir W. Milligan nor Major Westmacott had mentioned that the injuries incurred during the war were nearly always on the left side of the face, neck, and body. It had also been remarked that it was nearly always the left eye and the left limb (arm or leg) which were injured. This was explained by the position soldiers took to shoot or to use their bayonets, and nearly all the cases on the programme that day had had bullet wounds in the left side of the neck or face. Soldiers who had been shot in the right side had, as a rule, been retreating, and had naturally turned towards the right side.

MR. O'MALLEY said he had only sent notes of his typical cases; he was sorry he could not send skiagrams. The point mentioned by Mr. Wylie had struck him also; all his own cases had been wounded on the left side of the face. With regard to bullets turning round, he had a very interesting case a few days ago, in which a bullet entered through the left ala and floor of the left side of the nose. He found a large wound between the hard and soft palate. X-ray examination showed the

bullet lying transversely in front of the odontoid process. The interesting problem arose in this case as to whether the general surgeon should approach it through the neck, or should the nasal surgeon through the post-nasal route. In the end they did it in combination. An opening was made behind the sterno-mastoid, but it was the base of the bullet which was thus reached, and every time an attempt was made to free it, it seemed to move further away. He eventually delivered it by using his finger. The bullet was turned round as if it had entered sideways.

Dr. VINRACE desired to refer to a case which, though it occurred in civil practice, bore on the present discussion. A young lady was shot with a revolver pistol on the right side of the face, the bullet entering in front of the right external auditory meatus and emerging on the left side of the nose without causing any material damage. Healing took place in a very few days. A romantic aspect of the case was that after leaving the lady the bullet impinged the right shoulder of her lover, penetrated the cloth, passed down the lining of the coat, and was next morning brought by the gentleman in great triumph to the hospital.

Dr. DUNDAS GRANT said that at the hospital of "Val de Grâce," Paris, there were wards full of cases under this heading of the subject; they presented terrible disfigurements of nose, face, and jaw. With regard to the nose, he saw some of the stages of the operation practised by M. Morestin. The typical operation in some of the cases in which the nose was driven in and the nostrils turned up and looked forward, was to cut across just below the nasal bones and turn the upturned portion of nose downwards, leaving a large gap, which was stuffed with gauze. After a day or two india-rubber drains were put into the nostril, with weights attached to keep that portion of nose hanging down. M. Morestin then implanted a portion of cartilage from the eighth rib into the forehead, and in due course fashioned the upper part of the nose from the forehead, and brought it down on to the piece which he had originally detached. It was a combination of two previously described operations, and the result was a great improvement on the disfigurement which men would otherwise show. The passages of the nose were made quite free.

The PRESIDENT, in calling upon the authors of the opening paper to reply, said the experiences of members of the Section as set forth in the agenda, together with the subsequent discussions, would be of permanent instructional value for future guidance, and had been thoroughly justified.

Major WESTMACOTT, in reply, said the point made in the paper, that a bullet, if it were not doing harm, should be left *in situ*, had not been controverted. The patients under discussion were fortunate in not being septic when seen, as a rule. If any were septic, some peroxide of hydrogen and iodine had put them into a good condition to be dealt with by operative treatment. One case, which might have been mentioned in the paper, was that in which the whole of the maxilla was removed by a piece of shell, the lower jaw of the opposite side was also split at the symphysis and turned outwards, and the whole of the right cheek laid open. It had healed remarkably by trimming up and keeping clean. With regard to the functional question, their cases were purely functional ones, they were central rather than peripheral, and there was no ascertainable injury. In cases where there was injury to the cartilage of the larynx there was prolonged inflammation, during which time small pieces had necrosed away, but there was eventual healing.

Abstracts.

PHARYNX.

Fisher, A. G. Timbrell.—Sigmoid Tortuosity of the Internal Carotid Artery and its Relation to Tonsil and Pharynx. "Lancet," July 27, 1915, p. 128.

The author points out the conflicting statements of text-books relative to the proximity of the internal carotid artery and the tonsil, and discusses the normal and abnormal anatomy of the vessel. He considers that abnormal tortuosities are probably reversions to the lower mammalian type. The practical application of their anatomical abnormality is that, when the sigmoid curve lies in the coronal plane, it is liable to injury in operations involving the posterior wall of the pharynx. When in the sagittal plane it is more likely to be met with in operations on the tonsil.

Macleod Yearsley.

Stark, H. H.—Twenty-five Cases of Vincent's Angina successfully treated with Sodium Perborate. Special Report of Three Cases. "Annals of Otology, Rhinology, and Laryngology," xxiv, p. 48.

The perborate of soda (which is not the common borax of commerce) was prescribed in powder, two teaspoonfuls dissolved in a glass of water and used frequently as a mouth wash or gargle. The author thinks that Vincent's angina is a far more common disease than it is given credit for being. The diagnosis is difficult in gross lesions, and in suspected cases there should be an examination microscopically for the combined spirochetæ and fusiform bacilli. The sodium perborate in his hands has given uniformly good results. It is simple, without danger, eases pain promptly, and cures within a short length of time.

Macleod Yearsley.

Poynton, F. J., Higgins, T. N., and Pirie, G. R.—Inclusion Dermoids of the Pharynx. "Lancet," March 20, 1915, p. 595.

The authors describe a case of this very rare tumour in a female infant, aged five weeks. There was a round, pinkish tumour between the tongue and soft palate, only seen on "gagging." Under anaesthesia it was found to be attached to the left lateral pharyngeal wall between the anterior and posterior pillars of the tonsils by a narrow pedicle. It was easily removed. One and a half inch long and half an inch thick, it consisted of: (1) An outer covering of true skin, with hair follicles and sebaceous glands; (2) retiform tissue; (3) a bar of cartilage; (4) a central canal (? due to falling out of tissue in preparation). A short and useful bibliography is presented.

Macleod Yearsley.

THROAT.

Bosviel.—Apoplexy of a Tonsillar Pillar. "The Proceedings of the Parisian Society of Laryngology, Otology, and Rhinology," November 10, 1911.

This case concerned a man, aged fifty, a great smoker, subject to slight congestive attacks, who, after a slight cold, experienced vague prickings in the throat. He did not trouble himself about it and went

to bed with the window open, as was his custom. But in the middle of the night he was startled from sleep by an enormous ball obstructing his pharynx, and which he tried in vain to expel. This ball was hanging loosely in the throat and occupied the whole of the right side, bulging down behind the base of the tongue. The patient on introducing his fingers felt it easily. It seemed to him to resemble an elongated sausage, invading quite a half of the bucco-pharyngeal isthmus. After continually manipulating the swelling with the fingers, he ended by pressing with so much force on one point as to burst it; he spat out a mouthful of blood and felt somewhat relieved.

Next day he consulted the author, who was only able to observe the following: The mucosa was everywhere markedly congested, left anterior and posterior pillars and right posterior pillar normal. Tonsils red and slashed by numerous dissections. Right anterior pillar was red, slightly violet, œdematous, projecting beyond its usual limit, and presented on the internal half of its anterior surface a little shred of blackish sanguinolent mucosa which could only be due to a scratch by the patient's finger-nail the preceding night. Swabbings with adrenalin solution and a gargle were prescribed. When the patient returned two or three days later, there was nothing more than a slightly thickened pillar, still red. All the other appearances had gone. Although he had not witnessed the entire evolution of the trouble, the author felt justified from the history and objective signs observed by himself, in diagnosing sudden congestion of one of the pillars and extravasation of blood. One has observed a similar condition in connection with the uvula, but not having seen anything like it involving the faucial pillars, he thought it would be interesting to report it here.

H. Clayton-Fox.

NOSE.

Lubet-Barbon.—**Peripheral Facial Paralysis following use of the Nasal Douche.** "Proceedings of Parisian Society of Laryngology, Otology, and Rhinology," November 10, 1911.

This case goes to swell the numbers of accidents, already large, resulting from the injudicious employment of the nasal douche. Nasal lavage, the author holds, ought no more to be entrusted to our patients than the morphine syringe. It ought only to be carried out by the surgeon after having ascertained whether one or other fossa be obstructed, and care must be exercised to introduce the fluid from the narrow side towards the wider, so that the fluid enters under a minimal pressure and escapes without resistance. The patient does not know this, neither is he aware that he must not swallow whilst the fluid is passing. During deglutition the pharynx is contracted and the tubal orifice is opened, conditions favouring the entry of fluid into the tube. He is also unaware that the tongue must be protruded during the procedure; as long as this is done swallowing is impossible. There are many things to explain to one's patient; one does not always do it, and when it is done only half is returned. Moreover, nasal lavage is not advised without a cause, and this is most often a septic infection of the nose. Whence not only phenomena of injury to the contents of the tympanum, but grave infection of the entire middle ear.

A man, aged thirty-nine, suffered from chronic nasal catarrh, for which he used the hydrostatic douche daily. Towards the end of

September, whilst douching the nose, he felt his hearing dulled: he ceased, and a sharp pain supervened in the left ear, which passed off in a very short time, but returned more severely during the course of the day, accompanied by deafness with a sense of tension and fulness. He was seen by a colleague, who noted a slight redness of the drumhead, and after a summary dressing advised the patient to rest. Four or five days after the douche the patient awoke with facial paralysis, and consulted the author ten days after its onset. He found the usual symptoms of a complete paralysis. There was diffuse redness of the membrane with two little pulsatile reflexes in the postero-inferior quadrant. Hearing was only slightly impaired—a third compared with the sound ear. The membrane was not bulged. Catheterisation, practised very carefully, showed that there was no fluid in the tympanum. Hearing was much improved. He considered the pulsatile reflexes must be the evidence of spontaneous punctiform perforations. Nothing more was done than to insert a strip of protective gauze into the meatus. For some days, whilst the patient was under observation, the gauze remained dry. The punctiform spots disappeared and hearing returned almost to normal. As regards the paralysis, it had lasted almost six weeks and had diminished spontaneously and progressively. He was not aware if this accident from use of the nasal douche has already been observed, but it did not make him more favourably disposed to the procedure. *H. Clayton Fox.*

LARYNX AND TRACHEA.

Eccles, H. A.—Foreign Body in the Left Bronchus. "Proceedings of Royal Society of Medicine, Electro-Therapeutical Section," April, 1915, p. 61.

The patient, a girl, aged three and a half, swallowed a foreign body of doubtful nature on February 9, 1915. Sixteen days after a slight cough developed.

On the twenty-sixth day a skiagram was taken, discovering a long pin lodged in the left bronchus with the point upwards. Two days later the bronchoscope was passed. The pin was seized by forceps and removed. Rapid recovery. *Archer Ryland.*

EAR.

Ellis, Arthur W. M., and Swift Homer, F. (New York).—Involvement of the Eighth Nerve in Syphilis of the Central Nervous System. "The Journal of the American Medical Association," May 1, 1915.

The onset of sudden or rapidly progressing deafness in patients with syphilis is a not uncommon occurrence. It is due to a syphilitic lesion of the eighth nerve or labyrinth, and the prognosis is unfavourable. These affections should not be considered and treated as instances of isolated disease of the organ of hearing, but as manifestations of syphilis of the central nervous system. The question of the frequency of syphilitic affections of the eighth nerve in the early stages of syphilis is intimately associated with the question of the aetiology of the so-called "nerve relapses," the paralyzes of cranial nerves occurring in patients with secondary syphilis who have been inefficiently treated with salvarsan. These cases have now been definitely proved syphilitic, but the great

increase in frequency of such cases from the use of salvarsan has been exaggerated. The severity of these affections of the cranial nerves in early syphilis is rather markedly increased and somewhat more frequent in patients inefficiently treated with salvarsan.

In seven syphilitics with disturbances of hearing six of them showed definite evidence of extensive infection of the nervous system. The other case also showed signs of involvement, but the process was not extensive. It is to be emphasised that in all these cases the treatment previous to the onset of the affection of the eighth nerve had been quite inadequate, and the number of such cases occurring in any clinic is an index of the efficiency of the treatment of syphilis in that clinic.

All lesions of the eighth nerve should be considered as possible manifestations of a disastrous form of a general infection—syphilis of the central nervous system—and the value of repeated examinations of the spinal fluid in every case of this type emphasised in order to carry out the intelligent treatment and subsequent observation of all patients suffering from this serious condition.

Birkett (Rogers).

Moore, J. W. (Louisville).—Fracture of the Base of the Skull, with Escape of Cerebro-spinal Fluid from the Ear. The Effect of Atropine and Epinephrin upon the Secretion. "Amer. Journ. Med. Sci." April, 1915.

A boy, aged six, as a result of a fall backwards downstairs, sustained a fracture of the squamous and petrous portions of the left temporal bone, which extended into the internal auditory meatus. He was under observation in hospital for about twelve days after the accident, during most of which time there was a copious flow of cerebro-spinal fluid from the left ear. Death was preceded by the onset of meningeal symptoms.

Both the amount and the chemical composition of the cerebro-spinal fluid which flowed from the ear under various conditions and at different times was carefully noted. It was found that injection both of atropine and of epinephrin exerted an inhibitory influence upon the flow. Regarding the choroid plexus as the organ which secretes the fluid, it is to be supposed that atropine depresses the secretory nerves of the cells of the plexus in the same way as it does those of other gland cells of the body dependent upon nervous stimuli for their secretion.

On the other hand, the diminution of the flow which followed injection of epinephrin is to be explained by the existence of an inverse relationship between the intracranial blood-pressure and the secretory activity of the choroid plexus. The general rise of blood-pressure resulting from injection of epinephrin leads to increased flow through the cerebral vessels, and it appears that when this occurs a reflex nervous mechanism comes into play, which results in diminished activity of the secretory cells of the choroid plexus; when general blood-pressure falls the reverse occurs, provision thus being made for equalisation of the pressure on the cranial contents.

Thomas Guthrie.

MISCELLANEOUS.

Pernet, G.—Rodent Ulcer. "Proceedings of Royal Society of Medicine, Dermatological Section." May, 1915, p. 135.

The patient was a young man, aged twenty-six. The disease began two years ago as a small pimple in the left naso-orbital region, which had

gradually increased in size. The lesion was a characteristic rodent ulcer about $\frac{1}{2}$ in. in diameter.

The case was shown on account of the age of the patient, who was comparatively young for rodent ulcer
Archer Ryland.

REVIEW.

The Surgical Anatomy of the Temporal Bone.

Guide to and Catalogue of Specimens illustrating the Surgical Anatomy of the Temporal Bone in the Museum of the Royal College of Surgeons of England. By ARTHUR H. CHEATLE, Fellow of the College. Issued by Order of the Council of the College. London: Adlard & Son, 1915. Price 6d.

It is, perhaps, not too rash a prophecy to make that the next twenty-five years will see a complete revision in the style of the anatomy that will be taught to students of medicine. Points which have been hitherto emphasised will be quietly dropped as of no importance, while others, at present omitted or slurred over, will rise into prominence. This change, as everybody knows, was begun as long ago as 1860, when John Hilton first published his lectures on "Rest and Pain," but for years his was the voice of one crying in a wilderness where the pure anatomists had matters all their own way, and where students who intended to practise medicine and surgery in after life were drilled to regard importance of anatomical fact as relative to some embryological or evolutionary standpoint, the practical significance of anatomical details being quietly ignored.

Of recent years, however, a variety of causes, among which may be included the astonishing advances made in the surgery of special regions, have conspired to change the face of anatomy in such wise as to show us something alive, active, and practical.

In our own specialities the name of Onodi at once occurs to us as that of an exponent of the clinical and surgical anatomy of modern days, but the honourable memory of Zuckerkandl must not be forgotten—Zuckerkandl, of whom it has been jestingly said that for ten years after the appearance of his atlas all rhinological papers began and ended with his name.

Similar advances fall to be recorded in the matter of the anatomical varieties of the temporal bone, and it is to Prof. Mouret, of Montpellier, and especially to Mr. Arthur Cheatle, in England, that most of the recent work in this section has been performed.

Of Mouret's work we recently gave some account in our Reports of the last International Congress in London, and now the publication of the above Catalogue gives us an opportunity of renewing our acquaintance with Mr. Cheatle's researches, which, as most of our readers know, has been carried on in such a successful manner as to earn him the supreme honour of the Politzer Prize in otology.

The importance of the work requires no emphasising, and we advise all students of our speciality to spend as much time as they can spare in a detailed examination of the specimens in the Museum of the Royal College of Surgeons. Familiarity with them in their varying and yet classifiable types will confer upon the beginner as much skill in recognising the varieties of temporal bones as his seniors could only attain to after

years of operating. Indeed, there is much to be learned even by seniors. How many of them know, for example, that useful landmark, *Hugh Jones's line*?

Mr. Cheattle's collection is, therefore, a notable addition to the teaching equipment of London in our special department, and forms, together with the Toynbee specimens, a fine nucleus of what may grow to be a rich special museum, if others will follow the good example set them. At present, it must be confessed, the show of specimens, physiological and pathological, in the Museum from the other branches of our speciality, rhinology and laryngology to wit, is surprisingly poor.

Many of our readers are probably already acquainted with Mr. Cheattle's work and with the conclusions to which it has led him. For those to whom the work is new we proceed to give it in detail, basing our remarks upon the Catalogue.

In infancy, with the single exception of the mastoid antrum and the layer of small mural cells that occupies the inner aspect of the outer wall of that cavity, the mastoid process contains no cells whatever, the bone of which it is formed being of the usual cancellous, or rather diploëtic, character common elsewhere in the skull-cap.

This *infantile mastoid* persists throughout life in about 15 per cent. of people. A number of modifications occur during growth such as the natural increase in size and prominence of the process, and the disappearance of diploë from above and behind the antrum. But the process itself, not being invaded by air-cells, remains, as we have said, diploëtic.

This is the first type of mastoid process, and we shall later on describe its sub-varieties and indicate its pathological bearings.

The second type is the *cellular*, or, as it is sometimes termed when exaggerated, the *pneumatic* mastoid. In this the diploë has been replaced by air spaces which have extended from the middle-ear tract, a development which, as we shall see, may extend wherever diploë is present in the wall, for which reason to call the cells which may be present in the "mastoid" cells is obviously inaccurate.

The cellular development begins in early childhood, if not earlier; one of the specimens shows the process starting as early as one year and seven months. By the early twenties it is completed and arrested.

We proceed now to deal with those two leading types in detail.

THE ACELLULAR OR INFANTILE TYPE OF MASTOID.

In this type, as we have said, the mass of the mastoid is acellular, with the exception of the antrum and the layer of small cells upon the outer wall of the antrum. A point of great importance lies in the fact that in this type of bone the antrum with its mural cells is separated by a layer of dense bone from the rest of the mastoid. In infancy this layer of dense bone and the outer antral wall are, as might be expected, quite thin, but with the subsequent growth they become very thick. The outer antral wall may be $\frac{3}{4}$ in. in thickness. Thus in the adult acellular bone we have a diploëtic mastoid separated from the antrum by a thick shell of compact bone which may be as dense as ivory. This shell of dense bone shuts in the antrum not only posteriorly but also externally; it forms the outer wall of the antrum, and it is this hard bone which the surgeon so often has to penetrate when performing the radical mastoid operation for chronic suppurative of the middle ear. And the reason that it is so commonly met with in those circumstances is as follows:

In the acellular mastoid the only air-cells present are, as we have

seen, (*a*) the antrum itself, and (*b*) a layer of small cells in the outer wall of the antrum. This group of cells being isolated and shut off from the rest of the mastoid by a more or less thick shell of dense bone, it is obvious if the middle ear and antrum become the seat of an acute infection that the pus will be unable to perforate the dense bony envelope and to infect the mastoid process as a whole. Consequently those cases will not show the familiar external signs of purulent mastoiditis.

It must not be forgotten, however, that, although it does not proceed to infect the mastoid process, the infection may reach the labyrinth or the middle or posterior cranial fossa in spite of the bony barrier. And again, in these cases, such complications, when they arise, do so without showing any external signs of mastoid disease.

The course of an ordinary antro-tympanic infection in the acellular mastoid varies. First of all, if the drainage through the lower middle ear and tympanic membrane is free, if the antrum is small, and if the virulence of the infection is low, healing may take place.

But, on the other hand, if the infection is virulent, then it destroys the lining membrane of the antrum, and renders its walls, especially its outer cellular wall, carious. The membrane, ossicles, and outer attic wall are also destroyed, and the suppuration becomes chronic, with the usual formation of exuberant granulations, cholesteatoma, and so on.

In other words, apart from tuberculosis, it is in the acellular type of mastoid that an infection tends to become chronic. And this is the reason that we so often meet with the dense antral wall in performing the radical mastoid operation.

Here we must interpolate a note of explanation. According to the older view, the dense area of bone which surrounds the antrum is produced by osteo-sclerosis from the irritation of long-standing suppuration. But Mr. Cheatle's researches have clearly shown that this dense area is due to a developmental process. Instead of being an effect of chronic suppuration, it is a cause of chronic suppuration.

A certain amount of osteo-sclerosis from the long-continued irritation of purulent disease may undoubtedly occur. But when it does, it is relatively slight, being limited to the walls of the antrum: and, moreover, this localised osteo-sclerosis only occurs in the dense acellular mastoid. Mr. Cheatle has never seen it in a cellular mastoid.

THE CELLULAR OR PNEUMATIC MASTOID.

The extent to which the air-spaces may develop in a cellular temporal bone is very great, as we shall see when enumerating the varieties of this type. For the present we shall allude to the behaviour of this type of bone in the presence of infection and suppuration of the antro-tympanic cavities.

Obviously, in acute antro-tympanic infections of a cellular temporal bone the sepsis will very readily travel from the ear-spaces to the cells, where it will, the mastoid cells being affected, set up acute mastoiditis with the usual external signs. Further, the distance to which the disease may extend is limited only by the boundaries of the pneumatic bone.

As the specimens show, between the typical infantile or diploëtic mastoid with its dense antral envelope and the typical pneumatic mastoid there are several varieties of bone. In these transitional types the mastoid has been more or less transformed into cells with dense walls, the outer antral wall remaining dense as in the acellular type. As a consequence

those bones, when they become infected, even when the cells are infected, will behave like the infantile type: that is to say, they will not manifest the external signs of mastoiditis, and if the acute infection does not lead to immediate grave complications the disease will tend to become chronic.

Having now shown the importance of appreciating the two, or we may perhaps say, the three types of temporal bone, I shall now proceed to describe the varieties of each type in succession.

I. THE INFANTILE DIPLOËTIC MASTOID.

(For description see above.)

Varieties.—(a) Between the layer of cells in the outer antral wall and the outer compact envelope there is a thin layer of diploë. This variety is mostly seen in infants and occasionally in adults, and accounts for those cases in which the affection runs an osteo-myelitic course.

(b) The dense infantile variety, in which the mastoid mass is very dense.

II. THE CELLULAR MASTOID.

Varieties.—(See above.) (a) The upper mastoid is occupied by cells, the outer antral wall being dense. This type is fairly common.

(b) There is a narrow track of cells in a dense upper mastoid, with a dense outer antral wall, the lower mastoid being diploëtic.

(c) A narrow track passes down through an entirely dense mastoid, the outer antral wall also being dense. (Rare.)

(In the following varieties the dense outer antral wall persists, but the cells are not enclosed by dense bone. Consequently they behave like the typical pneumatic mastoid when infected.)

(d) There are cells throughout the mastoid; the outer antral wall is dense; the diploë is limited to the tip.

(e) The same as the last but without any diploë at the tip.

(f) A narrow track of cells in the upper mastoid leads to large cells in the lower mastoid, the outer antral walls being dense.

(Finally, in the varieties which follow the dense outer antral wall is no longer present, its place being taken by pneumatic cells.)

(g) The outer antral wall is cellular; there are cells in the upper mastoid, the lower mastoid being diploëtic.

(h) (*The commonest type of all.*) The outer antral wall is cellular; there are cells throughout the whole mastoid, with diploë at the tip only.

(i) The same as the last, but without any diploë at the tip.

(j) A large cell adjoins the antrum in the outer wall of that cavity and liable to be mistaken for the antrum itself. A series of large cells runs downwards and inwards to the digastric fossa, and crossing the suture invades the occipital diploë. The entire mastoid is otherwise diploëtic.

(This is a very rare form. If the antrum became infected pus could reach the neck without passing through the mastoid process itself.)

EXTENSIONS OF AIR-CELLS BEYOND THE MASTOID.

The specimens show the following extensions of air-cells beyond the limits of the mastoid process. From the pathological and clinical standpoint many of them are of great importance, as infection is liable to travel into those extensions:

(1) Up into the squama.

(2) Forward into the roof of the external meatus and into the zygoma.

- (3) Forward into the floor of the meatus.
- (4) Backwards over the lateral sinus and behind the antrum.
- (5) Inwards over and under the lateral sinus.
- (6) Inwards to the digastric fossa.
- (7) Inwards to the occipital fossa.
- (8) Inwards to the occipital suture and across it into the occipital diploë.
- (9) Inwards to the descending portion of the facial nerve.
- (10) Inwards to the jugular bulb.
- (11) Inwards over the jugular bulb and under the labyrinth to the lower part of the diploë of the apex of the petrous.
- (12) Inwards over the lateral sinus and under the semicircular canals.
- (13) Inwards behind the labyrinth under the internal auditory meatus and invading the apical diploë of the petrous.
- (14) Inwards from the middle-ear tract.
 - (a) Anteriorly in relation to the carotid canal.
 - (b) In front of the loop of the superior semicircular canal.
 - (c) Over the loop of the superior semicircular canal.
 - (d) Through the loop of this canal.
 - (e) Behind the loop.
 - (f) From the floor of middle ear.

All these may reach the apical diploë.

One very important point should be noticed, namely, that *no cellular extensions in any direction occur with the infantile types*.

Asymmetry between the two bones in the same skull, about which there has been a good deal of discussion of late years, is present in a gross degree in 7 per cent. of my specimens.

X-ray photographs are useful in determining the type of bone present in any case.

It should be noted finally that there is no means of judging by an external examination of a patient whether the bones are cellular or infantile.

So far as criticism of these conclusions are concerned, we confess that our sympathies are entirely or almost entirely with Mr. Cheatle's views. The only caution the reviewer would like to utter is, that while frankly admitting that the structure of the mastoid process must play an important *role* in the eventualities that attend upon suppuration of the middle ear, yet it would be wise not to lay too much stress upon this single factor. Acute mastoiditis with external signs may occasionally appear in the acellular adult mastoid, and in like manner one can imagine chronicity occurring even in a pneumatic mastoid. The reviewer is bound to say that he cannot recollect having ever seen an instance of the latter, and he is also bound to say that Mr. Cheatle expresses himself with becoming prudence, with regard to these points.

In conclusion, we again urge our readers to visit the fine collection for purposes of study at the earliest opportunity. Whether they do so or not we also strongly advise all aspirants to otological surgery to follow Mr. Cheatle's example in sectionising and studying dry temporal bones for themselves. A wooden vice and a fine fret-saw are all that is necessary for the purpose. The only difficulty, a serious one, is the scarcity of raw material as far as London is concerned at all events, Mr. Cheatle having made a corner in temporal bones.

Don McKenzie.

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GRANULOMA OF THE VOCAL CORD.

BY SIR STCLAIR THOMSON, M.D.,

London.

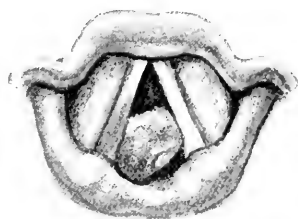
NEOPLASMS of the larynx, whether innocent or malignant, are uncommon—one might even say they are extremely rare. A recent statistic confirms this. Through the kindness of Dr. A. W. de Roaldes I have for many years received regularly the *Annual Report of the Eye, Ear, Nose, and Throat Hospital* of New Orleans, a pamphlet which is full of various and complete statistics. In the Report just received I see that, in the year 1914, treatment was given to 4750 cases in the ear, nose, and throat department. Yet amidst this large number there were only five cases of papilloma of the larynx, and one solitary case of epithelioma; a grand total of five innocent laryngeal tumours, and one cancerous growth in the large clinical material of 4750 patients seeking relief at a special hospital. On some future occasion I shall hope to return to the subject of the marked rarity of cancer in the larynx. For the present I would only accentuate the observation that in a special throat and ear clinic in New Orleans an average of 950 patients required handling before a single case of innocent laryngeal growth came under observation. I doubt if they are more frequently met with in this country.

Individual experience of innocent neoplasms of the larynx must, therefore, be always limited, and there need be little apology

from any of us for recording every case we meet which differs from the banal papillomata and fibromata.

Recently, in turning over a portfolio of medical drawings, I came across the one which illustrates this article, and fortunately I was able to find the following notes of the case :

The patient, Frederick M——, aged forty, came to my clinic on September 12, 1911, complaining only of hoarseness for the previous two months. The larynx presented the appearance very well shown in the drawing. The case book describes the growth as “a pedunculated, mobile tumour, adherent to the free edge of the right vocal cord, just in front of the processus vocalis. The growth is ovoid, smooth, purplish, and the unattached extremity is slightly yellowish and puckered. During inspiration it falls



Granuloma of vocal cord.

below the glottis. The right cord moves freely, and is only slightly injected. Some enlarged glands at the angle of jaw.”

The presence of the glands is noteworthy, in view of the importance given to them by some laryngologists as a factor in diagnosis. When the glands are not hard, not fixed, and not limited to one side only, I think their discovery should not be allowed a too preponderating influence in deciding that a growth is malignant.

However, it was not so much the presence of these glands that raised a faint suspicion that this growth might not be innocent, as a recent experience at the time which had taught me that a growth can be pedunculated, smooth-faced, and mobile, and yet be malignant. Anyhow, in view of this suspicion, I had a very good coloured drawing made, and on November 7, 1911, the growth was removed entire with Mackenzie forceps by the indirect method. The report from the pathologist was as follows : “The tumour consists of fibrin and granulation tissue. It is covered by a squamous-celled epithelium, which shows no evidence of malignant change. Diagnosis: granuloma (Percy B. Ridge).”

The after-history of the case is brief. The larynx was left quite clear. The patient was seen at intervals afterwards, the last note being dated March 19, 1912, four months after the operation, when there was no trace of growth and no suspicion of recurrence.

COMMENTS.

A granuloma must be a rare occurrence in the larynx; I find it is not mentioned in the list of innocent laryngeal growths in my own text-book! But doubtless this is because a granuloma cannot be looked upon as a neoplasm *sui generis*; it is but an inflammatory manifestation of some irritation, just as mucous polypi are in the nose. A granuloma in the larynx may have a specific cause, such as tuberculosis or syphilis, or a traumatic origin, such as a foreign body or the wound of a laryngo-fissure.

There was no specific basis in this case, and no history of traumatism. The site of the growth was too far back on the cord for it to be connected with the nodular thickening produced by the misuse of the voice, and too far forward to have any association with pachydermia. I cannot offer any altogether satisfactory explanation as to its origin, but I would suggest that it may have originated in a submucous hæmorrhage in a patient who did not give his larynx the rest necessary for complete absorption of the effused blood, but irritated it into a granuloma by misuse or over-use of his voice. The fibrin, beneath an intact epithelium, would be all that remained of the effused blood.

As already said, all laryngeal growths are rare, and a simple granuloma must be so uncommon that I trust this record of one will not be uninteresting.

THE OPERATIVE TREATMENT OF NASO-PHARYNGEAL FIBROMA.

By THOMAS GUTHRIE, M.A., M.B., B.C., F.R.C.S.,
Laryngologist to the Liverpool Royal Infirmary.

A CASE of fibroma of the nasopharynx, shown at a meeting of the Laryngological Section of the Royal Society of Medicine in March of the present year, gave rise to a short discussion which indicated much divergence of opinion as to the best manner of treatment in cases of this kind. The methods to which reference was made

included removal through the mouth with "adenoid forceps," or with cutting enrettes and vulsellum forceps, lateral rhinotomy, diathermy, and Nélaton's operation.

Complete removal of these growths can no doubt be effected in a variety of ways, including some of those mentioned, as well as others which have been elsewhere described, and probably no method is adapted to all cases. The views, however, of the speakers on the occasion referred to, appear to have differed sufficiently to indicate that the matter is still open to discussion, and to warrant a brief description of a method which I have found useful in a few cases which have come under my care.

The characteristics of these growths are too well known to call for mention here, but one still occasionally meets with articles, even in journals devoted to the diseases of the nose and throat, which suggest that in the minds of their writers the nasopharyngeal fibroma is not always clearly distinguished from the so-called "choanal polypus" on the one hand, and sarcoma of the nasopharynx on the other. To the "choanal polypus" the nasopharyngeal fibroma has, of course, no affinity either in structure, origin, or clinical features. Whether these growths ever become converted in sarcomata may perhaps still be an open question. If such a change does occur it must be an exceedingly rare event, and in the vast majority of cases the two types of growth are quite distinct in regard both to their structure and clinical course. For our present purpose the most important difference consists in the fact that the nasopharyngeal fibroma, although it may invade neighbouring cavities and cause pressure atrophy, and destruction of their walls, does not, like a sarcoma, infiltrate the tissues. This distinction has an obvious bearing upon the type of operation necessary for its removal, in that the requirements are fulfilled by complete removal of the tumour itself without, as in the case of the sarcoma, an indefinite surrounding area of *apparently* healthy tissue. The nasopharyngeal fibroma is indeed sometimes spoken of as an encapsulated tumour. Brady, to whose work reference will be made later, speaks of a well-defined capsule from which the tumour may be "enucleated." He states that the "vascular region of the growth is its capsule," and that hæmorrhage ceases as soon as the growth is separated from it. He describes the capsule as composed, in one of his cases, "of a firm layer of the pharyngeal aponeurosis." For my own part I have not been able to convince myself of the presence of a capsule, certainly not of a definite structure through an incision in which the tumour could be

enucleated, nor do my specimens show greater vascularity in the peripheral than in the central portions of the growth. However this may be, it is certain that, although the growth or portions of it may become firmly adherent to parts in contact with its surface, it is possible to separate it therefrom without risk of leaving behind microscopic cell deposits in apparently healthy tissues. Extensive and mutilating operations are, therefore, the less likely to be called for in these cases.

The obstacles with which we have to contend are three in number: (1) The profuse hæmorrhage; (2) the firm attachment and broad base of the growth; and (3) the difficulty of access to the main mass and its extensions. In reference to the first, it may be said that as the hæmorrhage, however profuse, almost always ceases immediately the growth has been removed, it should cause little trouble provided that the removal is complete, that it is carried out rapidly, and that means are taken to prevent entry of blood into the lower air passages. For this latter purpose we may select laryngotomy with a sponge in the pharynx, intratracheal insufflation anæsthesia, the use of Kuhn's tube, or Rose's position alone. In my first two cases I employed laryngotomy, but in the others found Rose's position alone quite satisfactory.

The second difficulty mentioned, namely, the firm attachment and broad base of the growth, calls for the use of instruments by means of which it is possible to exert considerable force both in detaching the mass and in extracting it when loosened from its bed. In none of the seven cases which have come under my observation could any approach to complete removal have been effected by means of either a cold wire or thermo-cautery snare; sharp curettes are unsuitable on account of the extreme hardness of the growth; while piece-meal removal with cutting forceps leads to much bleeding and carries with it the risk of incomplete removal. The most satisfactory instrument in my experience is a strong, half-sharp periosteal elevator, by the forcible passage of which, between the base of the growth and the bone to which it is attached, the mass may be so far separated that it can be wrenched away by means of strong, toothed catch forceps.

The third obstacle to removal, namely, the difficulty of access, has probably been somewhat exaggerated. To judge from reported cases some form of more or less extensive preliminary operation has been almost the rule. Yet such operations as removal or temporary displacement of the upper jaw are very rarely required, and even lateral rhinotomy must be demanded only in neglected and

advanced cases with numerous firmly adherent extensions. Nélaton's operation—splitting the soft palate with or without removal of a part of the hard palate and vomer—appears to have been frequently employed in these cases. It renders the nasopharynx somewhat

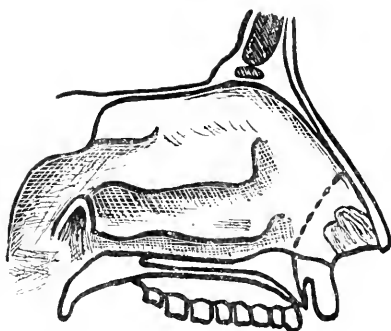


FIG. 1.—The dotted line indicates situation of mucoperiosteal incision.

more accessible to instruments passed through the mouth, but it does not in any way facilitate removal of extensions of the growth into the nose and accessory cavities; moreover it is often followed by permanent defect of speech. It is true that it provides a direct

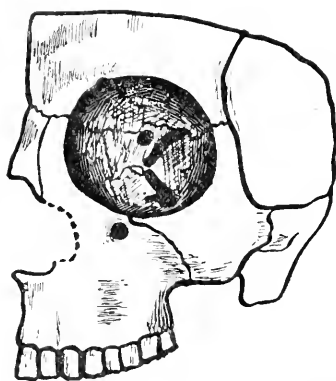


FIG. 2.—To illustrate the widening of the pyriform aperture by removal of a part of its bony margin.

view of the nasopharyngeal portion of the growth, but since immediately removal is begun the field is obscured by blood, this consideration is of little importance.

In July, 1906, Dr. A. J. Brady, of Sydney, advocated in this Journal the following method: Preliminary tracheotomy or Rose's position; enlargement of the apertura pyriformis by removal of a

portion of the nasal process of the superior maxilla through a skin incision passing down in the angle between the cheek and the nose and into the nostril, together with another incision carried outwards for 2 in. at right angles to the first; separation of the growth by means of a Langenbeck's elevator passed through the nose, guided by two fingers in the nasopharynx; and removal by strong catch forceps passed through the month. In one of his four cases he dispensed with the enlargement of the anterior bony nasal aperture, but although the growth was successfully removed, he did "not recommend the method for general use, as by enlarging the apertura pyriformis in the manner described, the growth can be more rapidly separated from its attachments, thus lessening the risk of hæmorrhage, which is the chief danger in these cases."

In October, 1910, I described in the *Lancet* a modification of Brady's method, which I had found satisfactory in two cases, and have since then employed successfully in two others. The modification relates to the widening of the apertura pyriformis, and consists in removal of a portion of the superior maxilla, where it forms the margin of the aperture, through an incision in the mucous membrane of the outer wall of the nose, instead of through the external skin incision, as practised by Brady. The mucous membrane covering the sharp margin of the aperture within the nose is incised for a distance of about three quarters of an inch (Fig. 1), and the bone having been exposed by stripping the periosteum and soft parts of the face from its outer surface and the muco-periosteum from its inner surface, a portion is removed with cutting forceps (Fig. 2), the margins of the incision being then allowed to fall together. Ample freedom of movement is thus secured for the shaft of a strong periosteal elevator passed through the nostril in order to separate the nasal and nasopharyngeal attachments of the growth. As much room is obtained in this way as by Brady's method, without the disadvantage of a visible scar. The mucoperiosteal incision heals without suture, and no deformity of any kind results. Since considerable force is required to separate the tumour, and detachment must be carried out rapidly on account of the bleeding, it is important that the elevator should be well adapted for the purpose. An instrument (Fig. 3), made for me by Messrs. White & Wright, of Liverpool, has proved very suitable. It is curved near the tip, has a rounded end and half sharp edge, and resembles the elevator devised by Killian for separating the periosteum in his radical operation on the frontal sinus, but is considerably larger and stronger.

After the main attachments of the growth have been separated it is grasped with strong catch forceps and torn away either through the nose or through the mouth.

Delivery through the nose is perhaps to be preferred, and after

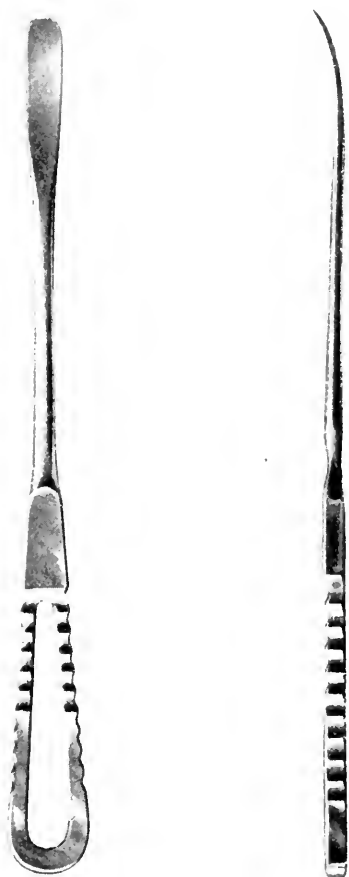


FIG. 3.—Elevator used for separating the growth. One half actual size.

the pyriform aperture has been widened as described above, can be accomplished in the case of all but the largest growths. Extensions to neighbouring cavities are usually much less firmly adherent than is the base of the main growth, and after a little loosening by means of the elevator round the mouth of the opening, may be drawn out from the cavity by means of the forceps ; as happened in

one of my cases in which a large mass, with a diameter varying from one and a half to two inches, occupied what appeared to be the greatly expanded sphenomaxillary fossa.

As already mentioned, seven cases of the disease have come under my observation. Of these, three were operated on by general surgeons, the method employed being, in the first of them, removal of the entire upper jaw; in the second, Nélaton's operation, followed, on "recurrence" of the growth, by temporary displacement of the upper jaw; and in the third, removal on two occasions by cutting forceps passed through the mouth and nose without preliminary operation. In each of these cases the patient eventually recovered from the disease, but in the first and second considerable deformity resulted, and in the second and third more than one operation was required.

Of the four remaining cases which I treated by the method I have described, the growth was completely removed at the first operation in three; in the fourth case, to which I have already referred, a second operation by the same method was performed four months later for removal of a portion of the tumour occupying the sphenomaxillary fossa, which had been overlooked at the first operation. In all four cases deformity is of course completely absent.

The method may perhaps be unsuitable when the disease has reached a very advanced stage, and the small number of cases in which I have employed it may hardly warrant very definite conclusions as to its value. So far, however, as my experience goes it appears to me to possess distinct advantages over other methods in dealing with most cases of the disease.

SOCIETIES' PROCEEDINGS.

PROCEEDINGS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

Held in Atlantic City, New Jersey, May 25-27, 1914.

(Continued from p. 195.)

The Employment of Skiagraphy in the Diagnosis of Enlargement of Thymus Gland.—D. Bryson Delavan.—Enlargement of the thymus gland, whether associated with the conditions known as "status lymphaticus" or otherwise, can no longer be called a pathologic curiosity.

Cases occur with sufficient frequency to have brought the subject prominently forward, and a considerable literature upon it has been developed during the past ten years. Indeed, there are few clinics in which accidents due to this cause have not occurred to patients under operation. Diagnosis by ordinary means is often difficult, and the only intimation of trouble comes late. Another difficulty lies in the infrequency with which illustrative cases present themselves. The average clinical attendant may never have seen one until he finds himself confronted with the fatal occasion. Two cases are recorded in which the Roentgen rays were used, aiding materially in the diagnosis of the presence or absence of an enlarged thymus gland.

Routine examination of every case requiring operation would be very expensive and consume much time, and the reader suggested the possibility of reducing the cost and lessening the time consumed.

Since to examine all would be impractical, suspected cases only should have X-ray examination before operation is attempted. Careful instruction should be given and clinical assistants warned as to the dangers of operating on patients with enlarged thymus gland, that they may be made competent to diagnose such cases when they present themselves.

DR. CORNELIUS G. COAKLEY: I recently had an experience in an adult. A man was sent to me for an opinion as to what should be done for what seemed, from the history before seeing him, to be goitre. The man had an enormous neck. Entire obliteration of the angle of the jaw was present, so that from the neck to the jaw was a straight line. There was slight exophthalmos. The pulse rate was 130 when quiet, and feeling that in all probability it was a case of exophthalmic goitre, I referred him to Dr. John Rogers. Radiography showed a tumour behind the sternum, a good-sized mass, with every suspicion that it was an enlarged thymus instead of a thyroid. After observing him for a week or ten days, Dr. Rogers thought the enlargement, which varied from time to time, was due to some lymphatic obstruction connected with the thymus gland, and suggested that he make an exploratory incision of the thymus behind the sternum, and if feasible to explore the enlarged growth to do so, and if a malignant process were found to leave it alone. He made his incision in the skin, and found that, instead of small peripheral veins, the superficial veins were as big as his little finger, perfectly enormous. He got his finger down and found an enlarged thymus gland, but thoroughly and extensively bound down to all the tissues in the thorax, with no possibility of removal without the death of the patient. He was sewn up and lived for only a few months. It is the only case of unquestioned malignant disease of the thymus in an adult that I have ever seen, and it was diagnosed pretty satisfactorily by radiograph.

DR. JOHN F. BARNHILL: The radiograph looks very much like a number of radiographs I have seen of the thyroid in the substernal variety, and, of course, that would hardly be the case in a child so young, but it might have been the case with Dr. Coakley's patient. It must be trying in such a case to be sure of the diagnosis. Dr. Wilson, of the Mayo clinic, has a large number of cases which closely resemble the one reported by Dr. Coakley.

DR. BURT R. SHURLY: This question of enlarged thymus is exceedingly interesting. These cases afford us practical interest when we know that tonsils and adenoids are quite frequently associated with these attending conditions of hypertrophy of the thyroid and thymus, and it is particularly interesting from the standpoint of the inter-relationship which the tonsils and adenoids and thyroid have to each other. The

enormous percentage is what I want to call attention to in a large autopsy report, showing that we undoubtedly operate on thousands of cases of enlarged thymus without knowing it, and it is only the very unusual case that dies suddenly that comes under our immediate observation. I happened to see a *post-mortem* at the Massachusetts General Hospital that showed what an alarming condition can be present in the way of an enlarged thymus, without anybody knowing anything about it. There are but few diagnostic methods from the physical signs to make one even suspect it. This case had all the clinical symptoms of status lymphaticus, and the boy had died from an incised wound of the knee under ether with just a few stitches being necessary. This brings vividly to mind in what great danger we are continually operating on adenoids and tonsils without knowing our danger.

Dr. THOMAS HUBBARD: Thymic asthma is a condition related to something like status lymphaticus, and pediatricists are working along a line similar to that suggested by Dr. Delavan for treatment by the X-ray; this is marvellously effective. Two cases have come under my notice, though neither was my case. One child was sent for an adenoid operation, the child under one year of age. The difficulty in breathing impressed the physician, and he called a pediatricist, who suspected thymic asthma, and the X ray showed a merging of the thymus and heart shadows, and, following the line of treatment which is now undertaken by the X ray, after seven treatments there was produced almost immediate and permanent atrophy of the gland. May this shrinkage not go on to an undesirable degree? Another case of similar type is one in which almost magical shrinkage of the thymus was produced in about the same aged patient. Both children seemed to have but a short time to live, both were extreme cases. The interesting feature is that the X ray is not only a diagnostic factor, but also a positive therapeutic cure in the very young cases which we occasionally see, owing to the obstructive type of respiration which is sometimes mistaken for adenoid obstruction.

Dr. HENRY L. SWAIN: I have twice had cases of thymic asthma, and diagnosed the condition with X-ray pictures, showing we were right, and then have secured marked benefit and a cure by the simple use of adrenalin ointment. The two glands, the suprarenal and the thymus, are antagonistic in action, and it did work very well, rubbing adrenalin ointment in over the top of the gland three or four times a day, and we got an appreciable diminution in size and the restoration of perfect breathing.

Dr. B. ALEXANDER RANDALL: I would like to call attention to a case in which, after incision of the tonsil, I lost the patient, aged twenty-two. It seems to me that much of the foregoing discussion points to the occurrence in rather early life, and we need perhaps to emphasise this possibility of a later exposition of it. This young man had two or three tonsil operations under ether, and had come through them successfully. Every care was given to him. There was no suggestion to my mind of thymic asthma, and his family physician had not found any evidence, and the amount of thymus enlargement found after death was not enough to give any mechanical explanation to the fatal issue, and yet he died twenty hours after the operation.

Nasopharyngeal Myxosarcoma: Several Operations and finally Spontaneous Recovery, under Observation for Twenty-seven Years.—E. Fletcher Ingals.—A boy, aged thirteen, was first seen by the writer in 1883. He had a large tumour filling the nasopharynx and

right nares, obstructing both sides by its pressure. It proved to be a myxosarcoma: most of it was removed. A small part grew behind the pterygoid process and appeared under the zygomatic arch in right cheek. Operation was attempted through the angle of the mouth, but severe hæmorrhage compelled the closure of the wound without affecting this purpose.

After all of the tumour had been removed anteriorly there still remained a large mass in the posterior nares attached to the roof. There was no way in which a wire could be placed around this. The writer forcibly introduced brass tubing containing a sharpened piece of copper wire. Several brass tubes were thus introduced, and through these wires were introduced encircling the growth in the different loops. The tumour was thus completely severed and withdrawn through the mouth. The patient became unruly and was sent home.

The tumour continued to grow, causing great deformity of the right cheek, and destroyed the vision in the right eye. Three or four years later it began to atrophy, and when he appeared fourteen years afterward, and again after his first visit, there were no remnants of the tumour, although the deformity of the cheek, the enormous cavity of the nose, and the absence of vision from the right eye continued. Although this growth was of a semi-malignant character, it followed the well-known tendency exhibited by fibrous growths in this locality, of retrogression and final disappearance between the nineteenth and twenty-third year of the patient's age.

Dr. HARMON SMITH: I wish to relate briefly a case reported recently of lymphosarcoma. I do not know whether the difference in pathology would alter the result with myxosarcoma. This case was sent to me by the General Memorial Hospital, to relieve the man so that he could breathe and swallow. The growth involved the right tonsil, pharyngeal wall, and palate, so that he could not breathe except in gasps, was cyanotic and greatly emaciated. I operated, doing a preliminary tracheotomy, believing I would have hæmorrhage; I took away half the tonsil and lateral pharyngeal wall but had no hæmorrhage: then I packed, but still no hæmorrhage. On the second day I removed the tracheotomy tube. This was done a year ago, and the patient returned again last January to the clinic, when there seemed to be involvement on the left side, and it was found by examination to be lymphosarcoma. He disappeared again for a month or so, then came back with extensive involvement on the left side. I took out the left tonsil, left pharyngeal wall, and the remainder of the palate. He seems now to have completely recovered. The only complicating feature of the case is that he had been subject to epileptic attacks, and when these tumours began to grow the fits increased in number: following operation they subside for a month or so.

The Simulation of Paranasal Sinus Suppurations for Teaching Purposes.—**Greenfield Sluder.**—The accessory sinuses of the nose having been opened by dissection from its cranial aspect in a section of the skull previously decalcified or hardened in formaldehyde and stained in an ammoniacal solution of carmine, is then preserved in a 2 per cent. solution of benzoate of soda. The latter prevents decomposition and also hinders corrosive effect on the hands. To simulate pus a preparation of subcarbonate or hydroxide of bismuth held in suspension in an hexatomic alcohol (mannite) and stained with anilin yellow and methylene blue is required.

A drop of this preparation is introduced into the opened sinus, and the examination is now made with a speculum introduced into the nose by means of a reflected light.

The simulation of the clinical picture thus produced is so true to life as to be astounding, and all the subtle variations may be reproduced by the quantity of the mixture or its dilution.

The Correlated Action of the Pharynx and Soft Palate, and its Effects upon Postnasal Diagnosis.—Greenfield Sluder.—The resultant action or effect of the pharynx and soft palate acting at once in the functions of empty swallowing and gagging is here considered. There is a gentle degree of muscular contraction in the ordinary act of swallowing, while in gagging the vermicular action is from below upward with the strongest contraction. The anatomic conditions with careful measurements are described and the dimensions given.

A pigment of a mixture of bismuth subcarbonate and hydroxide is introduced through one nostril by means of a small cannula and syringe to arrive at the upper surface of the soft palate at a point in the centre of the choanal outlet. In a normal adult pharynx, upon swallowing it is found to be spread over its posterior wall as high as the lower margin of the Eustachian tube on both sides. This, however, is by no means constant, and there is a varying degree of obliteration that may take place in swallowing or gagging.

The degree of elasticity in the soft parts is practically constant, and hence it is possible that obliteration may occur by the easy play of the muscles.

The greatest value of these studies is to know that by the ability of the small pharynx to approximate its walls it possesses the power to wipe away small amounts of thin secretion from any point of the choanal plane.

The practical application of these observations is that it illustrates the difficulty of locating discharge from the accessory sinuses into the posterior nares if the patient gags much.

Alterations in the form and size of the pharynx make the various deceptions possible. It is, of course, self-evident that pus at the classical sites well forward of the choanal plane, with or without a clean pharynx, is of conclusive diagnostic value, and is uninfluenced by any of the above enumerated possibilities. It is distinctly helpful to know to what extent a given nasopharynx is obliterated in swallowing or gagging.

Dr. CORNELIUS G. COAKLEY: We have had now an actual demonstration and exhibition of the appearance of sinusitis in the field of the nasal pharynx which have not arisen there, but have come from the nasal accessory sinuses. I think this is one of the most valuable contributions to the aid in diagnosis of sinus disease we have had in a long while.

Dr. B. ALEXANDER RANDALL: In speaking some years ago about the rather overlooked action of the upper edge of the superior constrictor which forms the so-called cushion, I dwelt on some of these points. I think we should bear in mind in this matter the extreme shelf-like character of that upper edge of the muscle, and take note how the soft palate will go entirely above that and show a deep cavity underlying the palate and modify this shelf-like effect, and this will go to show why from below in many cases the palate can reach clear to the vault.

Dr. JOHN F. BARNHILL: For a long time I have doubted any such thing as Thornwaldt's disease, namely, that pus formed in this normal pocket because of adhesions closing its mouth. I have yet to see such a

thing, and I have for a long time regarded pus in this region as absolute evidence of either post-ethmoidal or sphenoidal disease.

Limitations of Bronchoscopy.—Chevalier Jackson.—After a long series of successful bronchoscopic foreign body removals one is apt to think there are no limitations to bronchoscopy. The author had had five failures, one of which he excluded because he alone had bronchoscoped the case, and permission for a second bronchoscopy had been refused. The other four cases had been attempted by two or more other bronchoscopists, and therefore might be said to define the limits of bronchoscopy. The limitations of bronchoscopy were reached in the inability to find a small foreign body far down and far out at the periphery of the lung, rather than in a failure to remove when found. The limitations in a particular case could not be said to have been reached until bronchoscopy had failed at the hands of at least two bronchoscopists of experience. Then thoracotomy should be done immediately, without waiting for pus formation. In his own cases the author would not feel justified in advising thoracotomy until another bronchoscopist besides himself had failed. Waiting for a foreign body to be coughed up was inadvisable, because, as shown by Delavan, even after expulsion, death had followed from disease meanwhile set up.

DR. CORNELIUS G. COAKLEY: With regard to the case referred to, this woman had held a pin in her mouth; it was one with a white bead head and was about an inch long. She also had a very large goitre, which had compressed and dislocated the trachea so that it was practically impossible to pass a bronchoscope down to the trachea. We could not use force enough to pass it below the compressed area of the trachea as far down as the bifurcation. A tracheotomy was done and then a subsequent attempt was made to get the pin: the patient coughed and I lost the pin, which went down further with the point up, and although I was able to see it I was later unable to get it. Dr. Jackson did not even see the pin. I think there is no question that had the modern methods of lung surgery with the intratracheal anæsthesia been then developed, it would have been a perfectly safe and probably successful procedure in removing this pin. This attempt took place in about the first three weeks of the involvement. Dr. Jackson, in his modesty, did not tell you of another case. Dr. Jackson came to Rochester about two years ago to see my sister-in-law, who had inhaled a piece of orange peel through the larynx into the trachea, and developed soon after a very severe irritating cough and bronchitis, forgetting all about the original cause until about two weeks after the accident, when the physician discovered this localised bronchitis and could not understand why it was localised until he got this history. Moreover, on two or three previous occasions some similar foreign body had been taken in during the process of mastication, coughing, and inhaling, and each foreign body had been expelled within a few hours or two or three days after the accident. A radiograph showed considerable involvement of that side of the lung, but air could get in. After a physical examination Dr. Jackson decided, although there was nothing showing in the radiograph, not to do a bronchoscopy. The patient developed a bronchiectatic abscess or abscess of the lung, and discharged pus in great quantities, and lost fifty or more pounds in weight during the next six months. The sputum showed no evidence of tuberculosis. She made a good recovery after a year of suppurating process in the bronchus or lung about this bit of white skin from inside the peel of the orange. If Dr. Jackson had gone down and done a

bronchoscopy, in all probability with his skill he would have found that piece of skin and removed it and saved the patient the following dangerous, but fortunately not fatal, condition.

Dr. THOMAS HUBBARD: With regard to the limitation of bronchoscopy, this may often be established by the patient. Nothing is so exasperating as not to have your patient's support and that of his physician. Dr. Jackson will corroborate me in saying that secondary operations are very difficult ones without the full support of the patient and attending physician. On the other hand, occasionally the support of the patient is a factor in success. I recall the case of a woman who had a fragment of dental cement in the lower right bronchus: it was located about the ninth rib posteriorly, with some months of ulceration, abscess formation, and all symptoms of tuberculosis. This woman's intuitive conviction that she had a foreign body there saved her life. Although two or three radiographs showed nothing, she insisted there was something there, and finally it was located. The first attempt at removal was a failure: the abscess cavity was full of pus and *debris*, and I could not locate the foreign body: the second attempt was made with a stereoscopic picture to guide us, and we successfully removed the foreign body and the patient recovered. Following the first operation, I told her we had failed, but she said, "Never mind, you will get it the next time." That courage inspired us to do our best, and we were successful. I recently had another patient with an upholsterer's tack in the right lung, who had been worked upon four hours consecutively by a bronchoscopist under local anaesthesia. He had literally soaked the patient with cocaine, and his courage never faltered. After four hours' trial he consented to another type of operation. This I deemed impracticable by the upper method, fearing laryngeal oedema after such a prolonged use of the tube. So a low bronchoscopy was done and the foreign body was found. The previous efforts had turned it sideways, and made it very difficult to extract. I must say that I doubt if the upper method could have reached the point of that nail, because it was so far to the right, and it was necessary, in the introduction of the tube through the lower wound, to carry it off to an extreme angle to bring the tack into the tube.

Dr. EMIL MAYER: I recall being asked to see a boy who had a tack in his right bronchus, which had been there for more than a year, in the Presbyterian Hospital in New York. It was quite easy to do the bronchoscopy, but I could not see any sign of the tack. The bleeding was profuse, and put me in such position that I could not see any evidence of the foreign body, and I felt that here was one of the important rules to live by—"Be sure you are right, then go ahead." It is possible if then I had known as much about using the powerful magnet as Dr. Iglauder has recently recorded, I might have been more successful. In another instance, showing the difficulties of bronchoscopy, I was called recently to see a young infant of about thirteen months, who had inhaled an open safety-pin. A picture showed the pin in the upper portion of the larynx, and the local physician thought he could get it out by doing a tracheotomy. He failed. A second picture showed the pin had slipped down into the bronchus. It was not a difficult thing to introduce the bronchoscopic tube through the opening the physician had made, but the baby's condition was poor and I could not find the pin: the child's condition becoming worse, I desisted, and a few hours later the child died.

Dr. D. BRYSON DELAVAN: It is interesting to understand the limitations of bronchoscopy, but also to thoroughly realise what it has

done for humanity, and we all recognise that it is purely an American invention. Dr. Horace Green was the first to promulgate this method of treatment. Before the days of bronchoscopy the inhalation of foreign bodies was necessarily fatal. I remember a case in the eighties at the New York Hospital, where a young trained nurse with pleurisy was placed in my hands, and we aspirated the chest. When introducing the cannula, and just as we had it well in position and were about to withdraw the blade, the girl made a wild movement of the arm, drawing it sharply back so as to break the needle close to the body, and by the time we raised her arm the needle had disappeared. We said nothing about it; there was a rise of temperature, but the patient got well. I followed her about twenty years, during which time she carried on her function as a nurse in excellent health. Another case was a young farmer, who inhaled a full head of barley. The accident was followed by violent pneumonia, and that by abscess of the lung, which broke through the outer wall of the chest, and in coming away the head of barley was found intact. He survived all of this. Such results are extremely rare.

Dr. E. FLETCHER INGALS: I am very glad that Dr. Jackson has brought up this subject, and I hope he will in closing say something about the limitations as to time. Dr. Hubbard spoke of some one working for four hours, and this impresses upon me the necessity of having a final word on the time one may work on such a case. For my own part, I have felt that we ought not to work more than half an hour. When one feels the next second will be successful, he hates to quit; also when there is a good deal of secretion, you dislike to stop before you try once more. In some of these long drawn-out operations, about nine-tenths of the time is occupied in swabbing and one-tenth in looking for the foreign body. If we say no case should be operated on for longer than one hour, we would not be far wrong, while half an hour is the limit in the majority of cases. I have had my failures in getting out foreign bodies, and I have sweat blood over them. I have recently, as you know, written a short article on fluoroscopic bronchoscopy, which I think is going to be a great aid in certain cases. With foreign bodies which do not throw a shadow, we must still rely on ordinary bronchoscopy. When there is an abscess formation with much pus it is often impossible to find the foreign body. When there is a stricture it is liable to be impassable. Fortunately, some of these organic substances will be coughed out, but I think that 90 to 95 per cent. of people will die from foreign bodies in three or four years from various abscesses, usually multiple, unless the foreign body is removed.

Dr. WILLIAM E. CASSELBERRY: These bodies do not always stay put in the lungs; they are movable, some of them, and it may explain why some of them, such as collar buttons, etc., have not been found on bronchoscopic examination. This was illustrated in my practice by a large grain of raw corn, first in the bronchus of a very small child; the child was small, and I should perhaps have made a lower bronchoscopy, but I made an upper bronchoscopy, and although there was considerable difficulty in getting this tube through and in getting vision, it did go to where the skiagraph showed a spot which seemed to be the grain of corn, and this showed in four skiagraphs. It corresponded to a place where there was obstruction and density of air. I aimed for that spot with my very small bronchoscopic tube, and searched diligently, but found no grain of corn. Things were beginning to look very uncertain when, on withdrawal of the tube, gradually and cautiously, just as my tube slipped out of the top of the larynx, the grain of corn popped into view beneath

one vocal cord. In that position of the patient, with the head down, it had left its position in the bronchus and slipped up.

Dr. HARRIS P. MOSHER: I have put the limitations upon myself rather than upon the subject. Certainly, in the case where I hunted two hours the other day to find a foreign body, I felt the limitations were mine. In one case, after the patient came out of ether, there was a right hemiplegia, but that was the first time it had ever occurred in any case I have had to do with. The question came up as to what was the cause, whether it was the heart condition, the strain of the cyanosis in a thick-necked individual, or an embolus. There is another thing in connection with bronchoscopy. I have not seen it mentioned in the books, but it has occurred to me three times successively. This is a procedure that I do not feel like bringing before you, as it seems like going back to working in the dark. That is the old procedure of fishing. As you know, in many cases when you get the open speculum in, which was used before Dr. Jackson's speculum was devised, the cords stand very clearly apart and you look well down into the trachea. The trachea, however, is not likely to open. It occurred to me in such cases you might use the trachea for the tube in place of the bronchoscopic tube; in other words, having the cords well open, you could go down with your forceps and take a blind shot in the dark, knowing it was a blind shot. The first case of mine was in a two-year-old girl, who had a 2 in. pin lying head up and across. In that case a blind shot, boxing the compass with my forceps, was successful. The second case was a fifteen-months-old baby, who had a nail in the lower bronchus, head up, and in that case I decided to try a shot before putting the case under ether. I caught the head of the nail and brought it out. I just have had a third case in connection with Dr. Clark, in which a fifteen-months-old baby had a pea-nut in the bronchus for three or four days; the trial of a luck shot here did not reveal anything. A luck shot in the right bronchus produced nothing, but in the left bronchus it brought out the pea-nut. If you will gauge the limitations and put a limit on yourself, it is worth while to try this shot in the dark, because it will sometimes work.

Dr. CHEVALIER JACKSON, Pittsburg (in closing): In regard to Dr. Mosher's statement as to the limits, the point I want to make is that the difference between personal limitations and the limitations of the method are shown when two men have tried and failed, for then I think we can call that failure due to the limitations of the method rather than to personal limitations. In regard to the case of embolus that occurred after a foreign body which was quite easily removed four weeks previously with no special difficulty. Either from a septic endocarditis or from the lung itself an embolus had gotten into the cerebral circulation. His physician reported the boy improved for almost a month and gaining rapidly, when suddenly he had a convulsion with paralytic symptoms. Dr. Swain raises a number of interesting questions in regard to anæsthesia, but I have seen no reason to change my attitude in this regard from that of two years ago, especially in children under six years of age. In regard to suspension laryngoscopy for foreign bodies, I have not tried it, and therefore am not qualified to speak. I have no doubt it has a large field of usefulness. The limitations in regard to time were asked for by Dr. Ingals. Each must decide for himself. The limitations stated by Dr. Ingals are about right. If every man would publish the time used on every case it would be well. Half an hour for a child and an hour for an adult might be taken for a standard, to be modified in the particular case. My own personal limits have been in adults three and a half hours, but

this patient had no anæsthetic; he was a Marathon racer, an athlete used to enduring physical stress, and he insisted on my going ahead. Dr. Ingals brought up the limitations in upper lobe bronchoscopy, which I am glad he called attention to. The limitations I spoke of were far out in the periphery in the posterior branch, too small for bronchoscopy. All were failures to find, not to remove foreign bodies after finding them. Dr. Mayer's and Dr. Hubbard's points bring up too much for this discussion. In regard to Dr. Coakley's case, where we decided not to do the bronchoscopy, that was an error of judgment on my part, and is not to be taken into consideration in this discussion, because if we include the errors of judgment there is no limitation to what bronchoscopists may do.

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(Continued from p. 369.)

Treatment of Purulent Cerebro-spinal Meningitis.—William Sohier Bryant.—The object of this communication was to apply the experience of an unusually successful case to the management of this infection.

The treatment of purulent septic meningitis consists of (1) treatment for relief of the intracranial pressure; (2) treatment of the toxæmia; (3) treatment of the focal infection. The goal of the treatment is the control of intracranial pressure and toxæmia, and the treatment should, therefore, be symptomatically directed against these two means of fatal terminations of the disease.

The following case, showing recovery from purulent streptococcic cerebro-spinal meningitis, was related: The patient, a male, aged twenty-two, with symptoms of rapidly increasing coma, neuro-muscular signs of meningitis, rigidity of neck, choked discs, and purulent otitis media and mastoiditis. Temperature 102° F.; pulse 40. Cerebro-spinal fluid contained cocci in pairs and short chains and pus. Decompression at once removed the mental symptoms. Mastoid operation, hypodermoclysis, enemata, saline solution by mouth, and solution of magnesium sulphate by mouth. On the seventh day following decompression, all signs of meningitis had disappeared. Patient died 188 days after the decompression operation from toxæmia, caused by the repeated secondary infection of the decompression wound.

From this case the following conclusions are reached: "The combination of our experience as otologists with the experience of the obstetrician, makes the outlook for successful treatment of streptococcic meningitis appear much brighter than it has previously appeared. Oto-laryngologists should get as good results in cerebro-spinal meningitis as the obstetrician obtains in puerperal sepsis cases. Although the surgeon can readily protect the patient from death by intracranial pressure, the management of the sepsis is quite another problem. This problem of sepsis has received more attention from the obstetrician than from any other medical group or specialty. The treatment should be focussed on decompression,

local and systemic drainage, administration of magnesium sulphate, and stimulating general hygiene."

The Operative Treatment of Meningitis; the Haynes Operation; Supplementary Report and Analysis of Cases.—**Samuel J. Kopetzky** (New York).—The author reiterates the statement with which Dr. Irving S. Haynes prefaced his argument presented before this Society in 1912, advocating the trial of "Drainage of the Cisterna Magna" to cure certain types of purulent meningitis: "Septic conditions are usually surgical opportunities and demand surgical treatment."

The operative treatment of purulent meningitis had undergone scientific inquiry ever since the above statement was made, and the author presented the position now held by both Dr. Haynes and himself, after two years of further study and experience with meningitic infection.

The object of the Haynes' operation—the successful evacuation of pus accumulations and the eventful restoration of an unhindered blood supply to the vital medullary centres—and the author's work of disentangling the complex picture of meningitis so as to give data upon which an early diagnosis might be based, thus leading to a very early institution of this surgical relief before the disease had exhausted the patient and general sepsis had supervened, were fulfilled, and yet the establishment of drainage and its accompanying phenomena failed to secure the desired ends.

Critical study of the cases operated on presents the basis for the opinion that meningitis is not simply a surgical problem to be solved by finding a safe method by which to eliminate the pus accumulation in the cerebro-spinal fluid and to establish intracranial decompression; the analogy between the situation presented in purulent involvement of the meninges and infections of the peritoneum, or the pleura, does not hold. The change in the brain tissue is a factor of great moment in the aspect of the situation as at present considered.

In the author's opinion a large number of intra-meningeal invasions are brought about by the hæmatogenous route, and in otogenic meningitis the mechanics of infection are analogous to those which are found in the tuberculous and the meningococcus types of meningitis.

If this hypothesis be accepted, improvement is not dependent, as has been maintained by some observers, on the lack of toxins generated and washed away from the blood-stream, but is due to the remission of symptoms wholly due to decompression effects on the vital centres, and the unembarrassed blood-supply to the brain as a whole. The period of improvement really marks no advance toward the cure of the meningitis, but is only an evidence of the control of the pressure factors in the case. The study of the cases leads to the belief that the final stage is not one of sepsis, as has been held by some. These patients, even when they run high temperature curves, did not present themselves as individuals suffering from sepsis. The blood examinations which were conducted in this stage, were uniformly found negative for cultures on various media. The manner of death differs from that of death by sepsis. The patients all die suddenly, without paralytic phenomena, as if some unknown element suddenly overwhelmed them. The manner of death is significant of the inflammation of the brain tissue, which is progressively advancing in nature, and when the cells composing the brain itself are affected to a given degree, unknown in its definitiveness by means at hand at present, then life ceases, because its governing, controlling centres are inherently prevented from continuing their functional activity.

These conceptions concerning meningitis have been won because of the operation of cisternal drainage, and the careful study of the conditions which resulted from the operation. Inasmuch as this newly acquired knowledge may serve as a stepping-stone towards the eventual solution of these additional problems, the operation of cisternal drainage may yet mark an epoch in the effort to combat the ravages of the disease.

The operation should not be discarded entirely. It may prove a useful measure in selected cases, and if the other factors entering into the problems presented in meningitides come to solution, this means of operating will probably find renewed use because of the easy access it permits to the parts affected.

The author concluded by expressing the optimistic belief that the right road is being followed, that the surgical treatment of meningitis has advanced the comprehension of the disease, and that eventually means will be found to lessen the mortality percentage in this grave condition.

Dr. EWING W. DAY (Pittsburg) thought the only thing that had been accomplished so far by the work under discussion was to overthrow some of the existing theories. Cushing's theory, to the effect that death is caused by pressure and that if the pressure is eliminated the disease can be overcome, had been entirely overthrown. The cerebral circulation was not sufficiently well known for one to understand the matter. The work of Leonard Hill, of London, on the circulation was important in this connection. The easiest and most direct tract was through and down the posterior part of the brain. The place where the maximum amount of pus was found in all his post-mortems was back of the optic chiasm in the region of the cistern of the chiasma. He had thought there were probably some places where the circulation is very sluggish, and that around the cisterna posterior to the chiasma, where it supports the medulla, the circulation probably moves considerably more slowly than it does in other portions of the brain. It was in such places that pus was found in quantities sufficient to amount to an abscess. It seemed to be demonstrated that the space in front of the medulla could not be drained. That seemed not to be affected by drainage. He believed Dr. Kopetzky right when he said there is sepsis going on in all cases of meningitis. Almost all the cases, following drainage, ran a markedly septic course, with daily variations in the temperature, ranging from normal to 104° F. In one case sinus thrombosis was suspected, and the sinus was opened with negative results. In some cases the disease ran a typical septic course, the patient going off into coma, as in advanced typhoid, with muscular relaxation, loss of control of sphincters, dilatation of the pupils, and gradually going off into death. This was not the course in all instances, but in the majority. Referring to the case cited in Dr. Bryant's paper, in which streptococcus serum was used, the speaker said all the symptoms of meningitis were present, yet the patient recovered. He did not believe the treatment had any effect in producing a cure—he thought Nature did it. He did not believe there is any known agent or method which will cure an active meningitis.

Dr. FRANCIS P. EMERSON (Boston) emphasised the fact that two principles are to be observed in the surgical relief of any septic affection: first, the establishment of adequate drainage; second, the removal, as far as possible, of the diseased focal areas. The second problem in the surgical treatment of meningitis was impossible. With regard to the first, it was important to establish drainage early in the course of the disease, before the toxemia and sepsis have lowered the vitality of

the patient. Theoretically it might be better to relieve the pressure by reversing the lymph current. He thought a study of the autopsy findings would cause one to hesitate about operating upon any case, especially those similar to the admirable group which Dr. Day presented last year before this Society. Some cases have recovered without surgical intervention, and others have been cured by operative treatment. In the former class of cases the cerebro-spinal fluid was sterile. The question of diagnosis with reference to deciding whether or not to operate was important. The symptoms which led to the clinical diagnosis of meningitis did not tell one whether one has to deal with a circumscribed or a diffuse meningitis. Even should an active organism be found in the cerebro-spinal fluid it was necessary to cultivate it before a decision could be reached as to its virulency. Dr. Kopetzky's work, therefore, was important in stimulating renewed interest in the subject, that there may be more exact data for operative interference. His personal feeling, however, was that, so far as relief from surgery was concerned, sufficient advance had not been made in securing such data, and the results from surgery had not been sufficiently satisfactory to warrant the advocacy of any particular line of operative intervention.

Dr. J. S. KIRKENDALL (Ithaca) had been interested recently in the report of a case from a young physician in Ithaca, who is well versed in pediatrics. Dr. W. L. van Pelt told him that a young child had tuberculous meningitis soon after birth, its weight being only 9 lb. He gave this infant 25 gr. of urotropin daily, and the child recovered.

Dr. WENDELL C. PHILLIPS was interested in the case mentioned by Dr. Kirkendall, and asked if the cerebro-spinal fluid was examined. In Dr. Bryant's paper, descriptive of a case of purulent meningitis, the essayist had mentioned that the patient had a pulse rate of 40. A pulse rate of 40 had never been observed by Dr. Phillips in an uncomplicated case of purulent meningitis.

Dr. JOSEPH C. BECK had always understood that the pneumococcus was the least virulent of the organisms found in meningitis, and had thought his case of meningitis which recovered was that in which this organism was present. He had been working along this line for a number of years. He had had two cases within the last year in which he operated by the Haynes method. Both patients died, but he had learned a good deal from them. In one case of cerebro-spinal meningitis he gave urotropin, in doses of 180 gr. a day, then withdrew 10 c.c. of blood, and allowed it to settle to form a serum, which he drew off, centrifuged, and injected 4 c.c. intra-spinally, as suggested by Swift and Ellis with salvarsan in syphilis. The result was that he had a very irritable patient, with a very clear mind, for three days, but the man went on to death just the same. In another case he used collargol intravenously. There was a distinct change in the fundus in the eye in the form of a pigmentation.

Dr. DAY said he was asked by one of the surgeons why he did not drain the space in front of the medulla. He did that in one case, placing the drain underneath the dura, passing it up the cisterna, back of the chiasm, in front of the medulla. The patient went on to death just the same. He had to go inside the dura, and the cerebellum was crowded up, cutting off the drainage. The only other possibility was to put in a lead tube.

Dr. THOMAS J. HARRIS said Dr. Bryant had closed his paper by expressing hope for the class of cases under discussion, and yet had cited only one case in which there was recovery. From a careful study of the

literature it was the speaker's opinion that many such cases have been reported. One should be encouraged by well-authenticated cases which recover. One or two cases had been reported in New York which, he felt perfectly sure, were cured. The Germans made their diagnosis upon the findings in the cerebro-spinal fluid, pronouncing the case one of meningitis when the meningococcus was found in the fluid. One German clinic had reported forty cases of cured recurrent meningitis. This should be encouraging to all who are working along these lines.

Dr. SAMUEL IGLAUER (Cincinnati) called attention to the importance of some experimental work on the circulation of the cerebro-spinal fluid which Dr. Kramer, of Cincinnati, had been doing. This might readily explain the failure of the Haynes operation to provide adequate drainage in otitic meningitis. According to Kramer, circulation of the cerebro-spinal fluid below the tentorium is separate and distinct from that above the tentorium. If this be true, then drainage through the cisterna magna will fail to relieve the areas commonly involved in otitic meningitis. Kramer has also shown that methylene blue injected in the lumbar region of animals will enter a small pore in the lower portion of the spinal cord and ascend (ciliated epithelium) through the central canal to the fourth ventricle. Through a similar action he explained the fatal effects occasionally noted when serum (with toxic tricesol preservation) was injected in the lumbar region of children for the relief of epidemic meningitis.

Dr. SEYMOUR OPPENHEIMER (New York City) spoke of a case which Dr. Haynes quoted in his original paper. All the evidences of acute meningitis were present, and there were signs of some intracranial involvement. The child was operated upon promptly, the findings being sinus thrombosis, mastoiditis, extra-dural abscess, and a large area of encephalitis. The patient recovered. Four weeks later, meningitis developed. Lumbar puncture was made and *Streptococcus mucosus* found. Six months later the child again went into coma, and again the *Streptococcus mucosus* was found. It had had previously a very short and acute attack of nasal infection. The post-nasal infection could easily go through the roof of the aural cavity, the bony wall having been removed at the original operation. Fortunately, he obtained a *post-mortem*. He found evidences of an acute meningitis over the region of the middle cranial fossa. That suggested the point that, in view of the fact that it is impossible to differentiate clinically between circumscribed and diffuse meningitis, it is probable that many cases reported as cured are cases of very circumscribed suppurative meningitis.

The Observation of Nystagmus through the Closed Eyelids.—**Edmund Prince Fowler** (New York).—The anterior portion of the eyeball is the segment of a smaller sphere than the posterior portion, and consequently the cornea projects from the sclerotic, somewhat in the same manner that a water-glass does from its case. In different people and at different ages the degree of curvature varies, but at all times it is sufficient to enable one to follow movements of the eyeball in every direction, though the eyelids be closed. By observing nystagmus through the closed eyelids the following advantages are gained: (1) The eye muscles are at rest, and no accommodation or fixation occurs. Thus all patients may be tested under equal conditions in so far as these uncertain and disturbing elements are concerned. (2) There being no effort at fixation, after rotation, nystagmus endures from twice to three times as long as when the eyes are opened following rotation. Thus a longer, and

hence a more accurate guide is furnished for the rotation tests, and nystagmus may be aroused by weaker galvanic and caloric stimuli. (3) During vertigo there is an involuntary tendency to close the eyes and to keep them closed, as this lessens in some measure the dizziness. (4) By the use of suitable indicators, properly attached to the eyelids, the eye movements may be magnified a hundredfold, thus making for ease and accuracy of observation. (5) Upon properly placed revolving drums, or moving sheets, such indicators may be made to record graphically nystagmic movements of both eyes, during and after rotation of the body.

A means is thus provided wherewith to estimate not only the duration of nystagmus during and after rotation and the caloric and galvanic tests, but to study the magnitude and frequency, gradations, and variations of nystagmus in both eyes under different conditions. Such a study cannot fail to contribute something to the understanding of vertigo and allied phenomena. A study of the modifications of nystagmus in disease is made possible by the means suggested, and a nystagmogram may be preserved for future reference.

In order that inertia and momentum may be practically *nil*, the author has used paper or straw indicators, one end stuck to each eyelid, usually to the nasal side over the junction of the cornea with the sclera. Zinc oxide plaster or auto-tire cement are satisfactory adhesives.

One disturbing factor is the winking or twitching of the eyelids. This is clearly recorded upon the tracings. After a little practice these may be easily distinguished from the nystagmus oscillations.

For making the nystagmographic tracings a sphygmograph mounted upon a hocky puck is used, the latter being held between the teeth of the patient, and the blackened paper ribbon fed from the rear towards the front, away from the patient.

Dr. ARTHUR B. DUEL (New York City) thought Dr. Fowler had presented a very ingenious method of making permanent records of ocular phenomena in vestibular nystagmus. He did not think such observations necessary to diagnosis; but when the apparatus was perfected the records, for those who understood them, would be useful in reporting cases. The tracings of nystagmus would leave no doubt of its presence. When one must depend upon the house staff to report cases that arrived during one's absence, these tracings could be made and put into the records for subsequent study.

Dr. FOWLER replied that patients did not notice as much vertigo with rotation or following caloric reactions with the eyelids closed as they did with them open. For instance, one could produce nystagmic movements of the eyes with caloric stimulations and stop before the vertigo came on. Irrigation usually makes patients deathly ill, and it surely is a great advantage to be able to avoid this annoying feature of the labyrinth tests. In many neurasthenics the rotation tests show nothing on account of the incessant blinking and rolling of the eyes around and about. If the lids are closed some approximation to the duration of the nystagmus may be ascertained.

(To be continued.)

Abstracts.

PHARYNX AND NASO-PHARYNX.

Ewing, S. A.—**Relation of Adenoids as Causative Factor of Middle-ear Suppuration.** "Medical Journal of Australia," March 27, 1915.

During a period of seven years 445 patients suffering from suppurative otitis media, the large majority being cases of chronic disease, attended the Alfred Hospital. The ear condition in practically every case was due to unhealthy conditions in the nasopharynx. A. J. Brady.

NOSE.

Mahu, M. G.—**Radical Cure of Maxillary Sinusitis by the Nasal Route.** "Proceedings of the Parisian Society of Laryngology, Otology, and Rhinology," 1911.

As a sequel to the former work published by him on this question (*Press Médicale* du 10 Février, 1909, et *Annales des Maladies de l'Oreille*, Septembre, 1909) the author communicated certain improvements which he has effected in operative technique, with the idea chiefly of facilitating examination, curettage, and hæmostasis of the maxillary antrum after trephining the sinuso-nasal wall. He uses the following instruments:

(1) A punch forceps, cutting from behind forwards to enlarge the anterior part of the sinuso-nasal opening.

(2) A self-retaining nasal speculum, which gives greater access to the maxillary sinus.

(3) A rigid U-shaped curette for the anterior and inferior recesses.

(4) A curved dressing forceps, the shape of which facilitates the introduction of gauze for effecting hæmostasis. H. Clayton Fox.

Taylor, H. N.—**Note on a Tumour of the Maxillary Antrum.** "Lancet," May 1, 1915, p. 912.

A woman, aged thirty-four, complaining of pain "in the right side of the face." There were pain, tenderness, and bulging of the right cheek. No nasal discharge or obstruction of the nasal duct, and no exophthalmos. Extraction of teeth for the pain had not improved matters. Transillumination showed much opacity. The tumour was removed, and examination showed it to be both unusual and obscure in nature. It was composed largely of tough, fibrous tissue, with masses of gland-like elements all around near the surface and lymphatics with proliferating growth. No normal tissue was present, and its bulk was fibrous.

The patient made a good recovery.

Macleod Yearsley.

LARYNX AND TRACHEA.

Poyet, G.—**Laryngeal Syphilis with Œdema treated and cured by "606."** "Proceedings of the Parisian Society of Laryngology, Otology, and Rhinology," 1911.

The three patients in question presented grave respiratory troubles: Dyspnoea, stridor, and inspiratory recession. These symptoms rapidly

diminished (forty-eight hours) after the first injection and then totally disappeared. The author concludes that "606" may be successful in laryngeal syphilis accompanied by cedema, that is to say in the cases where the employment of iodide of potassium is contra-indicated and respiratory troubles demand prompt intervention. *H. Clayton Fox.*

Berard, Saignon, and Bessiere (Lyons).—Contribution to the Study of Laryngectomy. "Arch. Internat. de Laryng.," May-June, 1914.

Laryngo-pharyngectomy.—Whether the operation is done in one or two stages, the authors prefer, for the avoidance of infection, to remove the glands first of all. In cases where the posterior pharyngeal wall is certainly not involved, or if only a strip of it can be preserved, this strip is very useful to coapt the new (skin) wall of the pharynx. After the operation the patient is fed for some time by a nasal tube; eventually this is replaced by an œsophageal tube, which is used until a plastic operation is performed. In this latter two equal, or two unequal, lateral flaps may be used, or one large lateral flap covered over by another from the opposite side; this second flap is cut higher up and obliquely. A persisting fistula heals more readily if high up than if low down near the tracheotomy wound.

Laryngectomy apart from Malignant Growths.—When laryngo-fissure does not suffice, these operations are atypical, being usually less radical than for cancer. It is always possible to preserve the skeletal box of the larynx. The operation is usually done in one stage. Local anæsthesia is, as a rule, preferable, because there is no vomiting, and the patient can cough up blood; also, he is deprived of laryngeal reflexes which could interfere with the operation.

The authors consider hemi-laryngectomy the operation of choice for intractable cicatricial or cartilaginous stenoses.

Segmental Resection of Larynx and Trachea.—This is suitable for stenoses at the lowest part of larynx or uppermost part of trachea, or as a preliminary means of access to the œsophageal orifice.

The first step is a low tracheotomy; the method is more risky than simple laryngostomy, but the results are more rapidly obtained.

Partial Submucous Resections of Larynx.—The thyroid or cricoid cartilages may be attacked in this way, or, especially for ankylosis of the crico-arytænoid joints, one or both arytænoids may be removed through a laryngo-fissure opening. For this submucous removal of one or both arytænoids the surgeon employs a vertical incision, either through or just to one side of the posterior commissure.

If it be required to curette the laryngeal ventricles a transverse incision is made at the level of the upper border of the true cords. The cartilages of Wrisberg and Santorini need not be touched. The authors suggest that for persistent adduction-stenosis of the true cords the removal of a piece of lining mucosa of the ventricles, as is done in veterinary surgery, would be a more sound procedure than the mere curettage of the ventricles. During any manœuvres in these regions the larynx must be absolutely immobilised by an assistant. The after-treatment consists in intubation.

The complications and sequelæ exemplified in the authors' detailed list of recorded cases correspond so closely to those familiar to all laryngologists that very brief reference suffices. All their cases (three), which died as the result of the operation, died from secondary hæmorrhage due to sloughing. Death from falling back of the trachea into the thorax, which has occurred several times, is a strong argument for two-

stage operations, so that adhesions may fix the trachea in the tracheotomy wound. The contrivances of Péan and of Claude Martin combine a swallowing with a phonetic apparatus. The mortality from operation has been reduced from 50 per cent. to 20 per cent. Recurrence is common, sometimes *in situ*, but especially in the glands. It is of paramount importance to combine a maximum of drainage with a minimum of sutures.

H. L. Whale.

THYROID GLAND.

Pern, Sydney.—The Necessity of Lime in the System and its Relation to Goitre. "Australian Medical Journal," November 9, 1912.

The writer lives in a district where goitre is very frequent. For the purposes of study he divides goitre into two classes—endemic or purely hypertrophic and exophthalmic. Endemic goitre is prevalent in limestone districts. Exophthalmic goitre occurs where the drinking water and food are deficient in lime. In the writer's district there is absence of lime in the water, and a deficiency of the same in the food. Adults who came into his district did not get exophthalmic goitre, but their children did (activity of thymus gland in children); in some cases there are three generations of exophthalmic goitre. It is not necessary for the thyroid secretion to be above normal to produce symptoms of hyperthyroidism. Thyroid secretion forms some combination with lime, in which both are rendered inert; the combination is absolutely necessary for the proper growth and metabolism of the system, so that if there was not sufficient lime coming into the system to balance the secretion there would be all the effects of hyperthyroidism with a normal amount of secretion.

The treatment used in exophthalmic goitre is lactate of lime in 10-gr. doses three times a day. At first this seems to aggravate the symptoms; in about ten days or a fortnight this effect passes off, and improvement begins. Within a month the improvement is very noticeable; the patient begins to put on flesh rapidly; the goitre gets soft, then shrinks. As lime seems to aggravate the symptoms when first given, very acute cases were first treated with ergot to tone up the peripheral circulation, and take the strain off the adrenals, then calcium salts were gradually introduced. The whole arrangement of the peripheral circulation is regulated by the adrenals and the thyroid under the control of the vaso-motor centre. This study of the action between the adrenals and thyroid gland are worked out in an interesting manner, but it is too long for an abstract. Pern has found lime useful in asthma, general nervousness, and hay fever.

A. J. Brady.

ŒSOPHAGUS.

Barclay, A. E.—Peptic Ulcer of Œsophagus. "Proceedings of Royal Society of Medicine, Electro-Therapeutical Section," May, 1915, p. 96.

Patient was a nervous girl, aged eighteen. She gave a history of having brought up some blood at one time, and that, from time to time, she had difficulty in swallowing.

On giving opaque food it was found that there was a complete obstruction at the level of the seventh dorsal vertebra, which persisted for ten minutes at a time. The obstruction was clearly due to spasm.

(Esophagoscopy (Sir W. Milligan) showed a small ulcer $\frac{1}{4}$ in. in diameter.

The ulcer was treated by ionisation with zinc. A bobbin-shaped electrode on a wire, insulated with shellac, except at the neck of the bobbin, was dropped into the stomach. The patient then took bread-crumbs until the spasm came on. The bobbin was then easily pulled up till the obstruction was felt; applying more traction the bobbin slipped through the spasm, and the neck was firmly gripped and held in position by the spasm itself in contact with the ulcer.

Relief of symptoms was almost immediate, and the patient was perfectly well for three months.

Another ionic treatment was carried out, with the result that the patient remained perfectly well for a year. *Archer Ryland.*

EAR.

Mahu, M. G.—Radical Mastoid Operation in a Child, with Preservation of the Ossicles. "Proceedings of the Parisian Society of Laryngology, Otology, and Rhinology," 1911.

The case resembled two others published by the author in the *Annales des Maladies de l'Oreille*, October, 1910. The patient was aged eight. Aerial conduction was fairly good and he practised a partial radical operation, with resection of the bridge, as well as a portion of the attic wall, but preserved the ossicles in spite of invasion of the aditus and attic by granulations. As in the two previous cases, the final result was satisfactory and hearing was improved. Mahu draws attention to the point that there was in each of his three cases a mastoid fistula opening into the external meatus, through which pus escaped more freely than through the perforation in the membrane. He thought that if the presence of this fistula warranted one in assuming that there was a grave mastoid lesion, it also afforded hope of slight involvement of the ossicles, because it acted as a safety-valve, permitting the escape of pus from the antrum by an easier route than through the aditus, attic, and tympanum. If, therefore, in a case of chronic otorrhœa, without deafness, labyrinthine trouble, or cholesteatoma, one resolved on the radical operation with respect for the ossicles, the presence of a mastoid fistula must support this resolution. *H. Clayton For.*

Kœnig, C. J.—Iodine Fumigation. "Proceedings of the Parisian Society of Laryngology, Otology, and Rhinology," 1911.

Having read with interest in the *Press Médicale* of November, 1911, Reyne's article on Long's method, Kœnig draws attention to what he has already employed for the past six or seven years in the treatment of various affections of the ear (otitis sup. chronica, otitis adhesiva atrophica, etc.) and which enables iodine fumigation to be easily carried out by employing pure iodine, the iodine vapour being retained and carried onwards by a current of hot air, the effect of which is added to that of the iodine. To accomplish this, he employs:

(1) A small metallic capsule formed of two hemispheres screwed together, each being mounted with an end-piece, one conical for introduction into the end of the Eustachian catheter, the other cylindrical for adjustment to the tube of the hot-air apparatus.

(2) Lermovez and Mahu's hot-air apparatus, with which all laryngologists are familiar.

(3) The following preparation: Menthol, 1 grm.; camphor; iodine aa, 2 grm.; powdered talc, 30 grm.

This mixture, finely powdered, yields a powder the colour of cocoa. He has arrived at these proportions after experimental investigations. If less talc be added, a moist useless mass is obtained. A small quantity of this mixture is placed between two layers of cotton-wool with which the hemispheres of the capsule are lined. After having passed a current of hot air through the apparatus for a period varying with the temperature and strength of the current, nothing remains but the white talc powder. All kinds of volatile medicaments can be employed. In otology we can employ iodine vapour by passing it through the Eustachian catheter into the tube and middle ear, or into the latter alone *via* the external auditory meatus when there is a perforation of the membrane. In certain forms of chronic suppuration and adhesive otitis, the results are very appreciable. Another very simple method of utilising the properties of iodine, and more at the disposal of the general practitioner who may not possess the above apparatus, is that suggested by Paul Laurens and which consists in employing a concentrated solution of sodium iodide (30 per cent.), followed by the addition of an equal quantity of a solution of peroxide of hydrogen (12 vols.). The latter, like all peroxides, possesses the property of liberating iodine from iodides. This method might be termed the moist, and the other the dry. Each has its indications and advantages. The moist method cannot be employed through the Eustachian tube; the only route lies through the external auditory meatus.

H. Clayton Fox.

Wilson, J. Gordon (Chicago), and Pike, F. H. (New York).—Vertigo. "Journal of the American Medical Association," February 13, 1915.

Vertigo, its conception, and how this conception aids in the diagnosis and treatment of cases, so difficult both to the general practitioner and to the specialist, is the subject matter of this preliminary report. The complex aetiology of vertigo, its occurrence in so many diverse diseases, and its elusiveness to treatment are only too well known. One difficulty in its proper interpretation is the absence of any clear conception of what vertigo is. Although we have nearly all experienced, still few would be prepared offhand to define it. Whilst the term of "vertigo" is commonly applied to a sensation of rotation of surrounding objects or oneself, still there are other forms in which the sensation is one of instability either of oneself or the surrounding objects. Under the term "vertigo" must also be included sensations of many kinds: "a blurring vision, a feeling of discomfort or of anxiety, fullness in the head, as after smoking, a feeling of weakness, a disturbance of consciousness; in short, a variety of sensations which, if they persist, tend sooner or later to become more pronounced as disturbances of equilibrium."

Usually vertigo is due to some pathologic condition affecting the mechanism of equilibrium, but at other times it may be brought on by the mere thought or fear that should a disturbance of equilibrium occur a serious fall would result; for example, looking over a bridge into a ravine. When vertigo has once arisen, under certain conditions, it will be readily and more easily provoked again by the recurrence of these same conditions, due probably to the fact that anatomic paths once travelled are more easily travelled again.

To preserve equilibrium, impulses are constantly coming to the brain from (1) the ear, (2) the eye, (3) muscles, tendons, and joints, and (4)

the skin, touch, and pressure, all which impulses result in muscle co-ordination. That vertigo bears some relation to disturbance of equilibrium is admitted by all, though instability without vertigo, as in ataxia, also does occur. The tabetic, with his eyes shut, has instability, and he may have the sensation of vertigo, but he does not fall because of his vertigo. He falls because he experiences a sudden, unexpected loss of afferent impulses from the eyes, and he has vertigo because the sudden closing of the eyes has intensified the mental confusion resulting from the inadequacy of the impulses from the muscle, tendon, joint, and skin. In the tabetic the muscular inco-ordination, which is the primary factor, may appear without vertigo. In the labyrinthine irritation the instability is the outward manifestation of the vertigo, which is, or has been, present and may precede the instability. The most important of these impulses, on which the subject bases his conception of his position, or change of position, in space, and from a confusion or dissociation of which vertigo results, arise from the otic labyrinth and the muscular and retinal portions of the eyes. Both ataxia and vertigo are due to disturbances of afferent impulses concerned with equilibrium; but the ataxia is due to a loss in a group of afferent impulses, while vertigo is due to a dissociation of certain groups of afferent impulses, especially those from the head segment.

"It is not instability alone which constitutes vertigo on its subjective side; it is the rising into consciousness of the sensation of instability; it sometimes is the fear that such an instability may occur, or a fall be possible."

Normally the afferent impulses which maintain equilibrium are harmonised subconsciously in the cerebrum, and it is only when this harmony is ruptured that our attention is drawn to them. The conscious confusion which results is vertigo.

Vertigo, then, may be considered as the confusion resulting from the coming into consciousness of afferent impulses concerned with equilibrium, which impulses ordinarily are associated, but now for some reason have become dissociated. The most important of these afferent impulses are those from the ear, and slight disturbance of the labyrinth will cause severe vertigo. Visual vertigo is not so common clinically as labyrinthine.

Vertigo arises not only from disturbance of the peripheral sense organs, but lesions involving their central paths will also produce it. So disturbance, in the complex vestibular path, or the cerebellum, pressure on the eighth nerve or in the posterior fossa, and cerebral lesions will all cause vertigo. Again, it may occur in a hyperexcitability of the nervous system, as in neurasthenia, where the impulses, say, from the two eyes or two ears, may vary in intensity and vertigo result. *Birkett (Rogers).*

Borden, Charles R. C.—Systemic Infection of Middle Ear Origin in the Exanthemata. "Annals of Otology, Rhinology, and Laryngology," xxiv, p. 1.

An excellent exposition of a subject well known to otologists. One paragraph deserves especial prominence: "Both aurists and general practitioners of medicine may study aural complications more carefully, with profit to themselves and their patients. Only a comparatively few general practitioners understand the significance and dangers of such complications. *The average physician at large recognises an aural complication only when a profuse discharge from the ear refuses to be concealed any longer.* [The italics are the abstractor's.] The particular lesson for

the average specialist to learn is not to wait for the last possible symptom of mastoiditis, jugular thrombosis, or meningitis to develop before taking active operative measures for the relief of urgent symptoms. The extent to which this practice is followed by men whose wide experience should have taught them better judgment in the matter is astonishing. The excuse given is the patient is too ill to be operated upon. The sufferer is therefore allowed to die and the one real opportunity to save his life is lost."

Macleod Yearsley.

Haughey, Wilfred.—Bacterial Vaccine Therapy in Diseases of the Ear.

"Annals of Otology, Rhinology, and Laryngology," xxiv, p. 15.

Reports 16 cases, 6 being subacute purulent otitis, 6 chronic purulent otitis, and 4 classed as mastoiditis. The cases are added to those reported by Dabney in the *Laryngoscope* for November, 1914, and the total number thus classified is 425. Of these, 9½ per cent. were lost sight of and deducted, showing 78 per cent. of cures, 13 per cent. of improved, and 9 per cent. of unimproved in cases of subacute purulent otitis media treated by vaccines. In chronic purulent otitis media, the percentages are: 28 cured, 30 improved, and 42 unimproved; and in cases of mastoiditis they are 67, 24, and 9 respectively.

Macleod Yearsley.

Sawrey, Ernest R.—The Causation and Diagnosis of Suppurative Otitis.

"Medical Journal of Australia," March 27, 1915.

Adenoid vegetations are the most common cause of this condition. A small amount of adenoid tissue, insufficient to cause nasal obstruction, may be a potent cause of evil when situated in the region of the Eustachian tubes. In suppurative otitis media where free drainage is established through the meatus, if pain continues the probability of extension to the mastoid must never be overlooked. Disease of the mastoid may exist when the mastoid appears perfectly normal externally. Attention is drawn to an important point. Sometimes in a case of acute mastoiditis, often on both sides, in which a very thorough opening and drainage has been made of the mastoid, antrum, and alitus, immediate amelioration of symptoms results, but in a few days, or perhaps at once, the symptoms recur, rigors occur frequently. The patient has an evening temperature of 102° F. or even 106° F. for days or even weeks. It has been impossible to find any local cause for the symptoms; in spite of this every one of these cases has got perfectly well.¹

A. J. Brady.

MISCELLANEOUS.

Cumberbatch, E. P.—Malignant Growths treated by Diathermy: (1)

Carcinoma of Tongue: (2) Carcinomatous Ulcer of Cheek.

"Proceedings of Royal Society of Medicine, Electro-Therapeutical Section," April, 1915, p. 53.

Both cases inoperable. Ulcer of the tongue measured 1 in. by $\frac{2}{3}$ in., and there was much surrounding infiltration. The diathermic cautery was applied in January, 1914. The ulcer completely healed six weeks later. The only present indication was the appearance of the outer

¹ For discussion on pyrexia after mastoid operations see JOURN. OF LARYNGOL., RHINOL., AND OTOL., September, 1915, p. 350.

border of the tongue, which was slightly concave. It was now covered by a smooth layer of epithelium.

The operation took ten minutes, and the result was better than could have been expected after the application of the knife.

The second patient, a man, aged sixty, had a rodent ulcer on the cheek in front of the ear. Treated with X rays and radium without permanent result. Last July the diathermy cautery was applied, and the edges and base of the ulcer were coagulated and sloughed off. Smooth, supple skin could now be felt covering the site of the former ulcer.

Archer Ryland.

NOTES AND QUERIES.

THE LUTIN REACTION FOR THE DIAGNOSIS OF SYPHILIS.

Luetin is an extract of the killed cultures of several strains of the *Treponema pallidum* (*Spirochaeta pallida*). The killing of the spirochaetes for this purpose is effected by heating to 60° C.; 0.5 per cent. trikresol is added as a preservative. The preparation is carefully tested to insure sterility, and is then placed in sterile ampuls or capillary syringes.

Method.—A site on the skin of the arm is cleansed and sterilised, and the luetin is injected into the skin as superficially as possible. The injection should be made *between the layers of the skin, not under the skin*. If properly done a small pale swelling is produced, which subsides in from ten to fifteen minutes.

Dosage.—The amount of luetin to be injected for one test is 0.07 c.c.

The following phenomena indicate various types of positive reactions:

(a) The *papular type* consists of a large raised papule, reddish in colour and usually 7 to 10 mm. ($\frac{1}{4}$ to $\frac{1}{2}$ in.) in diameter, which makes its appearance in twenty-four to forty-eight hours. The papule may be surrounded by a diffused redness and show marked telangiectasis. The size of the papule and the induration may increase slowly during the following four to five days, after which it begins to recede and the colour gradually becomes dark brownish red. The induration gradually disappears within two weeks.

(b) The *pustular type* resembles the papular type until about the fourth or fifth day, when, instead of beginning to recede, the inflammatory processes increase in intensity, the surface of the papule becomes oedematous, with the formation of multiple military vesicles, and a central softening of the papule. Within the following twenty-four hours the papule is converted into a vesicle filled with serum, which later becomes purulent. The pustule soon ruptures and becomes covered with a crust that falls off within a few days, leaving a small induration, which is converted into a cicatrix after healing.

(c) In the *torpid type* the site of injection fades to an almost invisible point within three to four days, so that it may erroneously be considered a negative reaction. After ten days, or even longer, the spot suddenly begins to enlarge and goes through the same stages as seen in the pustular type.

Results.—Noguchi¹ reports the results of the cutaneous reaction of 642 cases, comprising 315 syphilitics, 77 parasyphilitics and 250 controls.

In cases of primary and secondary syphilis which had had either insufficient treatment or no treatment at all, the reaction was negative except in a few instances in which the positive reaction was of the indurated papular type.

Most of the syphilitics in the secondary stage who had been treated with mercury followed by salvarsan, and who remained without symptoms for some months thereafter, gave strong positive reactions. In cases of tertiary and late hereditary syphilis there is usually an intense positive reaction. It is in these cases that the luetin test is of the greatest value. By this means it is possible to diagnose the disease in its diverse and obscure manifestations—a feature of great importance when it is desired to ascertain whether or not internal lesions are syphilitic. In this stage of the disease the Wassermann reaction is frequently negative, especially when patients have received recent treatment.

¹ "Serum Diagnosis of Syphilis," by Hideyo Noguchi, M.D., M.Sc. J. B. Lippincott Company, Philadelphia. Third edition, 1912. Chapter on Luetin Reaction.

In parasyphilitic cases the reactions were so variable that no definite decision could be made regarding their diagnostic value.

Dr. Noguchi and others have reported on various cases of tuberculosis, leprosy, pneumonia, typhoid fever, and various diseases other than syphilis, in which the test was applied, and in none of these did a positive reaction occur.

Based upon observations by various investigators since Noguchi, the value of the luetin test may be summarised as follows:

The luetin reaction is specific for syphilis.

It occurs most constantly and intensely during the tertiary and latent stages.

It is usually absent or very mild in the primary or secondary stages, although in these stages it may become positive after energetic treatment.

In infants with congenital syphilis it is less marked than in adults with congenital syphilis.

Repetition of the Luetin Test.—If a patient who gives a positive luetin reaction is tested again after a month's interval, the reaction takes the same form. If the test is made at intervals shorter than a month the reactions appear somewhat quicker, showing a shortening of the incubation period. The duration of the reaction is also shorter. When an injection of luetin is made within one week of the positive reaction, only a mild reaction may take place, occurring within twenty-four hours and quickly fading away.

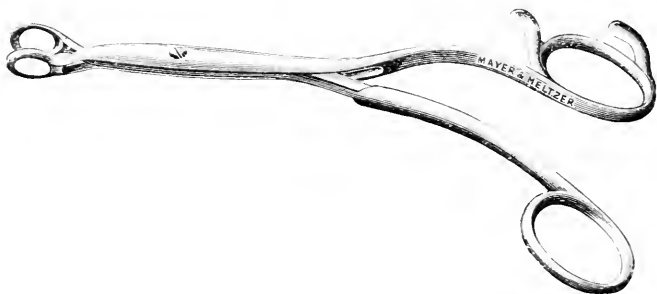
Effects of Treatment on the Luetin Test.—The luetin reaction is little affected by the usual intermittent mercurial treatment, with the exception, as previously stated, that in primary and secondary syphilis the reaction may become more positive under the mercurial or salvarsan treatment. Theoretically the test should become negative only when all of the spirochaetes in the body of the patient have been killed. In practice, however, the negative luetin reaction should never be relied upon as an evidence that the patient is cured.

Noguchi states: "The absence of the clinical and serological signs of syphilis over a period of one year is certainly an encouraging aspect; but, considering the possibility of these signs being absent in some latent cases, one has a right to hesitate in pronouncing these cases as cured. It is in this connection that the luetin reaction may become a great aid in settling this important question. As already stated, the luetin reaction alone cannot decide the point; but, combined with other means of diagnosis, it is bound to throw some light into this problem."

NEW INSTRUMENTS.

NASAL FORCEPS.

These are Luc's nasal forceps with the handle bent on the flat at an angle which permits the operator to keep the blades always in view.



I have found them very useful in ordinary nasal work, like removing polypi and middle turbinals, as well as in the finer forceps manipulations in the submucous resection. The flanges on the handle provide additional holds for the fingers and add to the handiness of the instrument.

It has been made to my design by Messrs. Mayer and Meltzer.

DAN MCKENZIE.

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**A RECONSTRUCTION MODEL OF THE RIGHT MIDDLE
AND INNER EAR.¹**

BY J. S. FRASER, M.B., F.R.C.S. EDIN.,

Assistant Surgeon, Ear and Throat Department, Royal Infirmary, Edinburgh;
Aural Surgeon to Leith Hospital; Lecturer on Diseases of the Nose,
Throat, and Ear, School of Medicine of the Royal Colleges,
Edinburgh; and

J. K. MILNE DICKIE, M.D., F.R.C.S. EDIN.,

Demonstrator of Anatomy, University of Edinburgh; Assistant
Aural Surgeon, Leith Hospital.

THE model illustrated in this paper was constructed primarily with the object of facilitating the teaching of the anatomy and physiology of the ear, and also to have before us an exact reproduction of an anatomical specimen.

**METHOD OF PREPARATION OF MICROSCOPIC SECTIONS OF THE
PETROUS BONE.**

(a) *Preparation of the Block of Bone containing the Middle and Inner Ear.*—As the preparation of microscopic sections of the temporal bone is a somewhat intricate and delicate process, the writers give a short account of the method employed. For a more detailed description the reader is referred to a paper by one of us

¹ The model was exhibited at the International Medical Congress, London, 1913.

(J. S. F.) in the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, December, 1913.

The temporal bone is obtained as soon as possible after death—certainly within twenty-four hours. The dura mater is divided round the internal auditory meatus, so that the nerves may not be pulled out when the dura mater is stripped from the bone to allow the fixing solution to soak in. The superior semicircular canal is

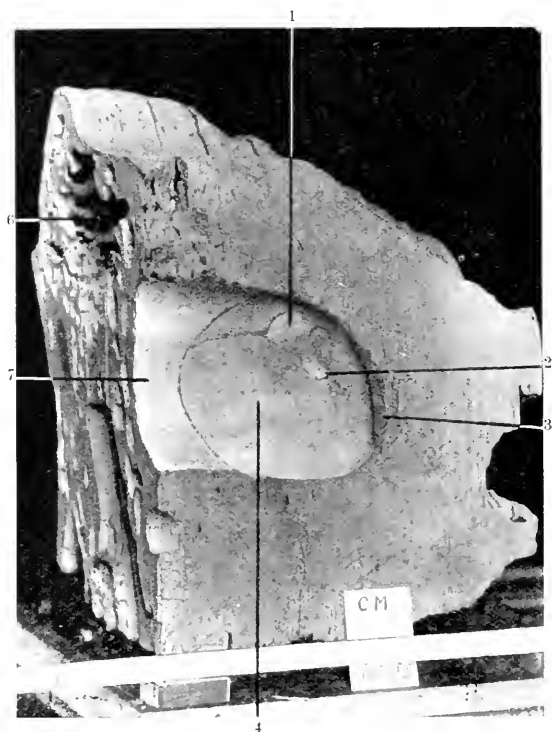


FIG. 1.—Lateral aspect of model. 1. Short process of malleus. 2. Umbo. 3. Anterior wall of external meatus. 4. Membrana tympani. 6. Air-cells. 7. Posterior wall of external meatus.

opened with bone forceps to allow the fluid to enter the labyrinth. With the saw a cuboidal block, containing the more important parts of the middle and the whole of the inner ear, is now cut out from the temporal bone. The first saw cut is made in a vertical direction at right angles to the long axis of the petrous pyramid just in front of the internal auditory meatus. The second saw cut is made parallel to and behind the first, through the mastoid antrum posterior to the semicircular canals. The third vertical saw cut is made in an antero-posterior direction through the middle

cranial fossa and external auditory meatus, and runs parallel to the posterior surface of the petrous pyramid and to the middle ear cleft. The last cut is in a horizontal direction about a quarter of an inch below the internal auditory meatus, and passes through the jugular fossa.

In this way a six-sided block is obtained. The anterior wall of the external auditory meatus is now removed with bone forceps so

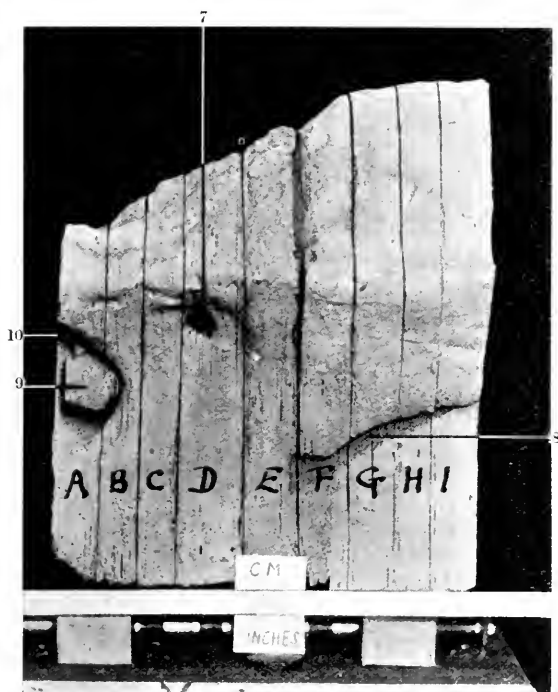


FIG. 2.—Postero-medial surface of model. 7. Subarcuate fossa. 8. Opening for saccus endolymphaticus. 9. Seventh and eighth nerves. 10. Internal meatus.

as to expose the membrana tympani. The lining of the jugular bulb is stripped off and the anterior wall of the carotid canal is removed along with the internal carotid artery. The block is washed in running water for a minute or two to remove bone dust, and is afterwards fixed in 5 per cent. formaldehyde for one month, the fluid being changed on several occasions.

(b) *Decalcification, Washing, and Hardening.*—After fixation the specimen is kept in decalcifying fluid for six weeks in a wide-mouthed, glass-stoppered bottle. For decalcification Perenny's solution is recommended (HNO_3 10 per cent., 400 c.c.; abs. alc.,

300 c.c.; chromic acid, 0.5 per cent., 300 c.c.). During the first week the fluid is changed daily, during the second week every second day, and during the third and subsequent weeks the fluid is changed twice weekly. After decalcification the block is washed in running water for five days, and is then carried through gradations of alcohol till it reaches absolute alcohol. Before embedding

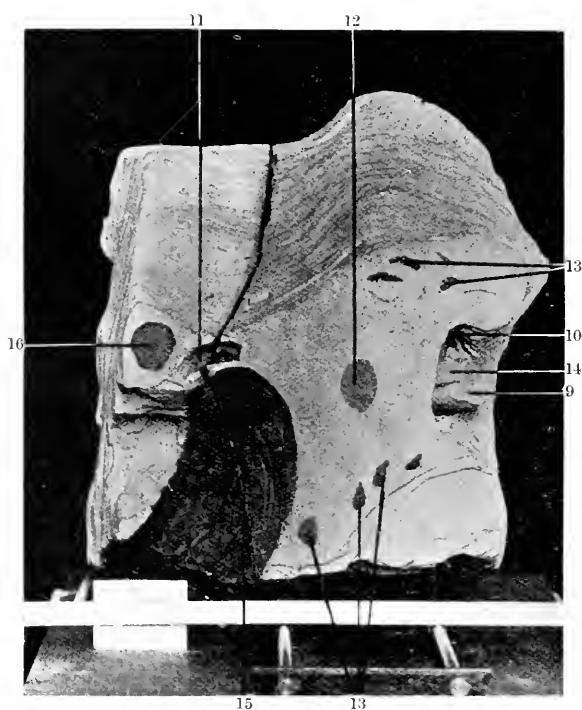


FIG. 3.—Anterior surface of model. 9. Eighth nerve. 10. Internal meatus. 11. Eustachian tube. 12. Capsule of cochlea. 13. Marrow spaces. 14. Facial nerve. 15. Carotid canal. 16. Tensor tympani.

it is placed in alcohol and ether (equal parts) for twenty-four hours.

(c) *Embedding*.—The block is placed in thin celloidin for one month, and then transferred to thick celloidin for one month. At the end of the second month the celloidin is allowed to harden. The specimen is finally mounted on a stabilite block and cut with the Schantze microtome.

(d) *Cutting and Staining*.—The specimen from which the model was made was cut in serial, vertical, transverse sections (30μ), and yielded about seven hundred sections. These were stained with Meyer's hæmalum and eosin and mounted in the usual way.

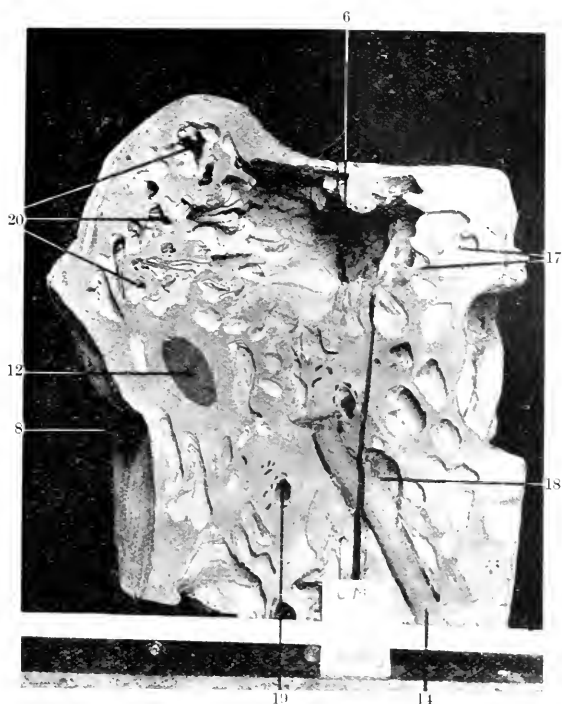


FIG. 4.—Posterior surface of model. 6. Aditus. 8. Opening for saccus endolymphaticus. 12. Capsule of posterior canal. 14. Facial nerve. 17. Border air-cells. 18. Chorda tympani. 19. Sinus tympani. 20. Air-cells.



FIG. 5.—Outer wall of tympanic cavity. 4. Tympanic membrane. 11. Eustachian tube. 14. Facial nerve. 15. Carotid canal. 16. Tensor tympani. 18. Chorda tympani. 20. Air-cells. 21. Handle of malleus. 22. Attic. 23. Head of malleus. 24. Body of incus. 25. Posterior ligament of incus. 26. Jugular bulb. 27. Floor of tympanum.

METHOD OF RECONSTRUCTION.

For the purpose of reconstruction a drawing was made on paper of every third section at a magnification of 25 diameters by means of an Edinger projection apparatus. Each sheet of paper with its drawing was then incorporated in a wax plate 2.2 mm. in thickness. The calculation for the above is as follows: $30 \times 25 \times 3 = 225 \mu$. The hollow spaces on the drawing were next cut out with a sharp

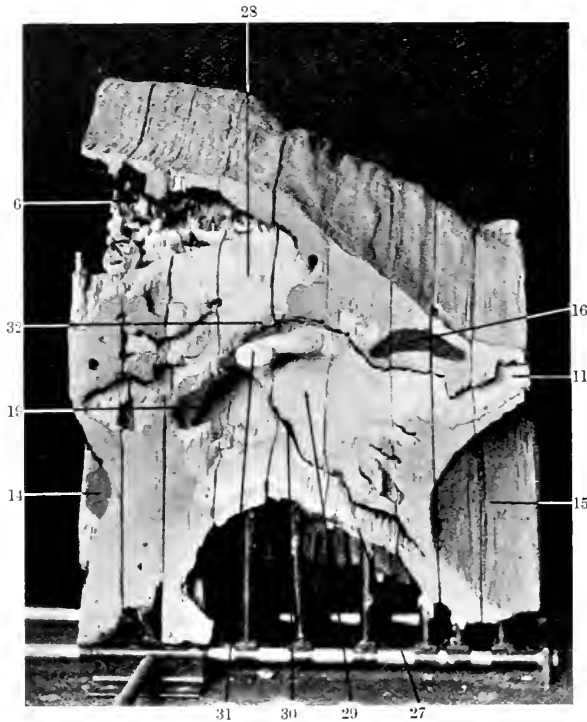


FIG. 6.—Inner wall of tympanic cavity. 6. Air-cells of antrum. 11. Eustachian tube. 14. Facial nerve. 15. Carotid canal. 16. Tensor tympani. 19. Sinus tympani. 27. Floor of tympanum. 28. Eminence of external canal. 29. Promontory. 30. Niche of round window. 31. Stapes. 32. Facial canal.

knife on glass. The plates were superimposed in their proper order and stuck together by running a hot iron round the edges. The model was divided into several pieces, suitably painted, and finally mounted so that it could be taken apart.

DESCRIPTION OF MODEL.

The model has been constructed so that the outer wall of the tympanum with malleus, incus, and chorda tympani can be removed

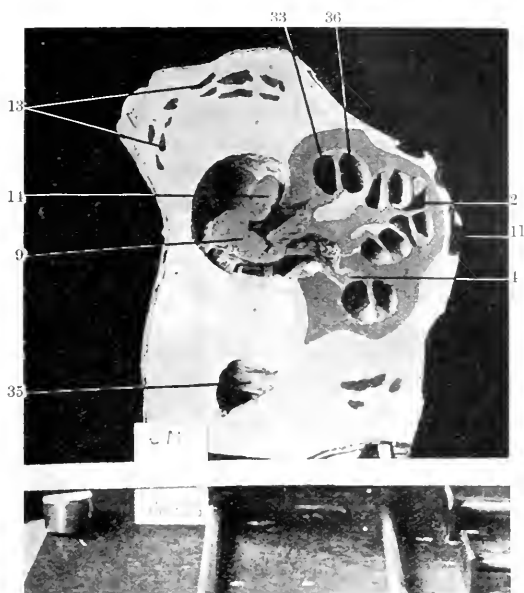


FIG. 7.—Posterior surface of segment B. 2. Helicotrema. 4. Modiolus. 9. Eighth nerve. 11. Eustachian tube. 13. Marrow spaces. 14. Facial nerve. 33. Scala tympani of basal coil. 35. Aqueduct of cochlea. 36. Scala vestibuli of basal coil.

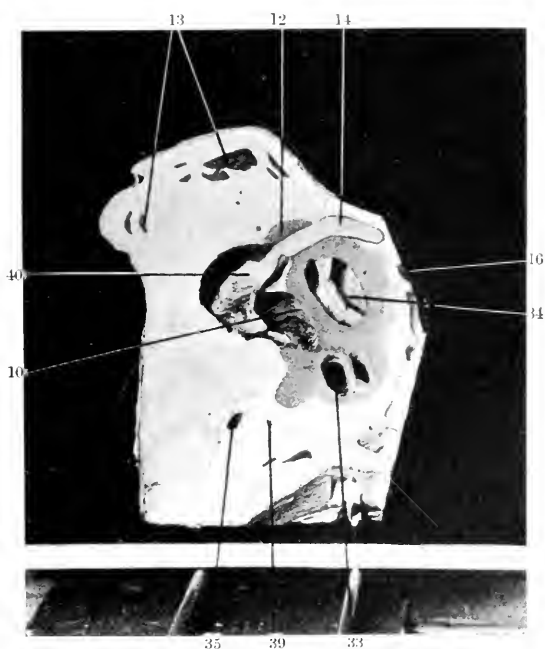


FIG. 8.—Posterior surface of segment C. 10. Fundus of internal meatus. 12. Capsule of labyrinth. 13. Marrow spaces. 14. Facial nerve. 16. Tensor tympani. 33. Scala tympani of basal coil. 34. Scala vestibuli of middle coil. 35. Aqueduct of cochlea. 39. Vein accompanying aqueduct of cochlea. 40. Vestibular ganglion.

in one piece in order to expose the inner wall. The part containing the labyrinth is divided into a series of nine segments, which can be separated from each other, so as to expose the labyrinthine structures. For convenience of recognition, the mucous membrane has been coloured pink, the ossicles white, the cut surfaces of lamellar bone light grey, the dense cartilage bone of the labyrinth capsule dark grey, nerves and endolymph spaces yellow, perilymph

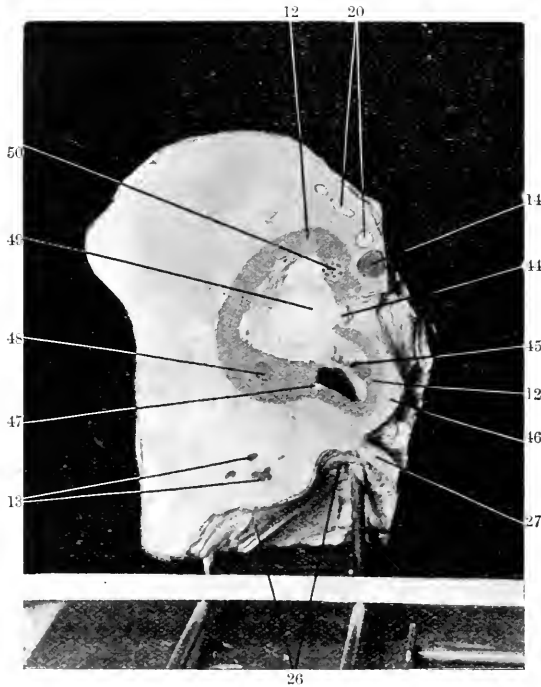


FIG. 9.—Posterior surface of segment D. 12. Labyrinth capsule. 13. Marrow spaces. 14. Facial nerve. 20. Air-cells. 26. Jugular fossa. 27. Floor of tympanum. 44. Footplate of stapes. 45. Scala vestibuli opening into vestibule. 46. Promontory. 47. Opening of aqueduct of cochlea. 48. Branch of vestibular nerve. 49. Vestibule. 50. Branch of vestibular nerve.

spaces blue, the carotid canal scarlet, the tensor tympani and stapedius muscles brown, and the jugular fossa dark blue. The cartilaginous part of the Eustachian tube at the one end, and the posterior part of the mastoid antrum at the other end, with its adjacent air-cells, are not included in the model. Owing to technical difficulties in mounting the model, it does not lie in its correct anatomical position, but is tilted backwards and inwards.

The study of this specimen has brought out several interesting anatomical facts. The convolvulus-like structure of the tympanic

membrane is well shown, and is illustrated in Fig. 5. The umbo of the malleus extends very low down on the tympanic membrane—beyond the most retracted point. The bony portion of the Eustachian tube lies immediately under the floor of the middle cranial fossa in its anterior part. The lumen is, moreover, not circular in section, but oblong (Fig. 3). Its very close relation to the carotid canal is also well seen in the same photograph (3). The tensor tympani has a curved course: anteriorly it lies to the

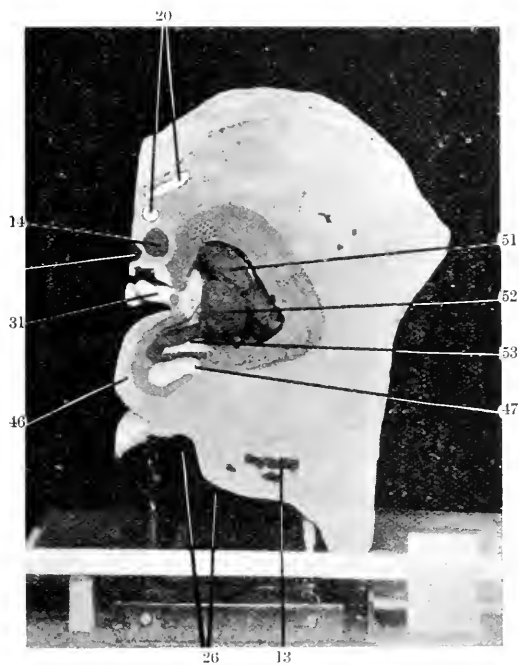


FIG. 10.—Anterior surface of segment E. 13. Marrow spaces. 14. Facial nerve. 20. Air-cells. 26. Jugular fossa. 31. Stapes. 46. Promontory. 47. Membrane of round window. 51. Utricle. 52. Sacculle. 53. Ductus reuniens.

outer side of the tube (Fig. 3), then above it, then on the inner wall of the tubal part of the tympanic cavity (Fig. 6), and finally the tendon curves outward across the tympanic cavity to reach the internal surface of the handle of the malleus. The high position of the opening of the tube into the cavity is worthy of note (Figs. 5 and 6).

The floor of the tympanic cavity is formed by a thin convex plate of bone covering the jugular bulb. In places this plate of bone is dehiscant, there being only mucous membrane and fibrous tissue between the tympanum and jugular bulb. The roof of the

cavity is also dehiscant in places. There is a well-developed sinus tympani, which extends backwards in close relation to the ampullary end of the posterior semi-circular canal (Fig. 12). It passes between the posterior canal and the descending part of the facial nerve and reaches the posterior surface of the model (Fig. 4). Some fairly large veins, draining the walls of the sinus tympani, pass directly into the jugular bulb (Fig. 12). A great number of small air-cells

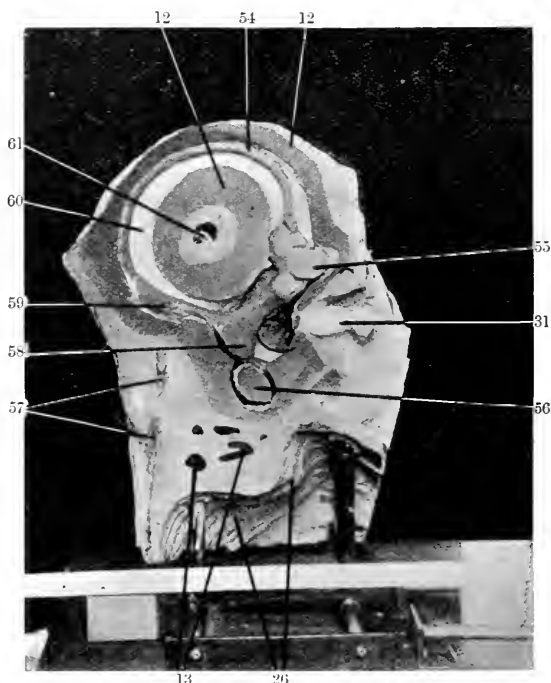


FIG. 11.—Posterior surface of E. 12. Labyrinth capsule. 13. Marrow spaces. 26. Jugular fossa. 31. Stapes. 54. Membranous superior semicircular canal. 55. Ampulla of external canal. 56. Ampulla of posterior canal. 57. Ductus endolymphaticus. 58. Posterior end of external canal. 59. Crus commune. 60. Superior canal. 61. Subarcuate veins.

in this case almost surrounded the semicircular canals, and also extended into the posterior wall of the deeper part of the external auditory meatus (Fig. 4). The facial nerve, in its descending part, is completely surrounded by cells of varying size (Fig. 4). Air-cells also extend forwards below and external to the Eustachian tube, and are separated by only a very thin plate of bone from the carotid artery (Fig. 5). It would be easy to mistake these cells for the Eustachian tube when trying to curette the stricture at the radical mastoid operation.

In this specimen the arrangement of the folds of mucous

membrane round the ossicles was comparatively simple. The attic and the rest of the tympanic cavity communicate freely with each other. There were no folds binding the stapes to the neighbouring structures. It should be noted also that the opening of Prussak's space was situated anteriorly.

On the posterior surface of the bone the subarcuate fossa was very poorly marked (Fig. 2). In it, however, was a leash of

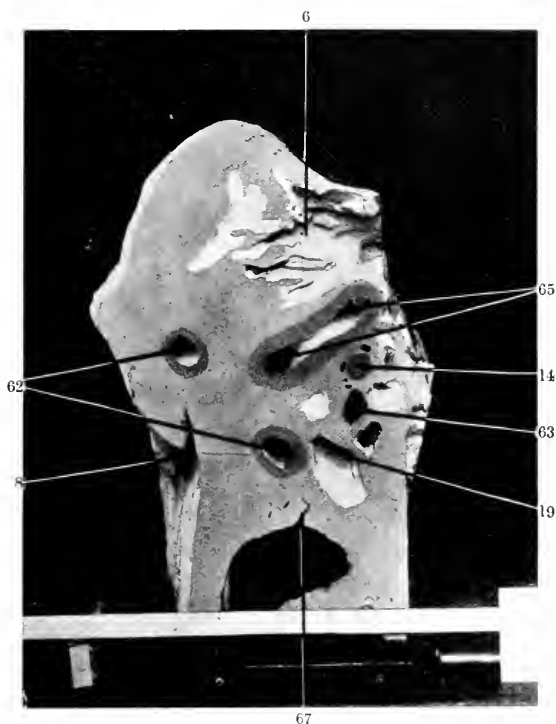


FIG. 12.—Posterior surface of G. 6. Air-cells. 8. Opening for saccus endolymphaticus. 14. Facial nerve. 19. Sinus tympani. 62. Posterior canal. 63. Stapedius. 65. External canal. 67. Veins from sinus tympani to jugular bulb.

vessels, which could be traced through the bone from the mucous membrane of the inner wall of the antrum. These vessels pass through the loop formed by the superior canal (Fig. 11). This route may explain the occurrence of meningitis following on acute otitis media in a case in which the labyrinth remains healthy.

It should be noted also that the eminence on the superior surface of the petrous bone does not correspond with the position of the superior semicircular canal; the latter lies distinctly anterior to the eminentia arcuata. The perilymphatic or cochlear aqueduct

in this case does not open on the posterior surface of the petrous

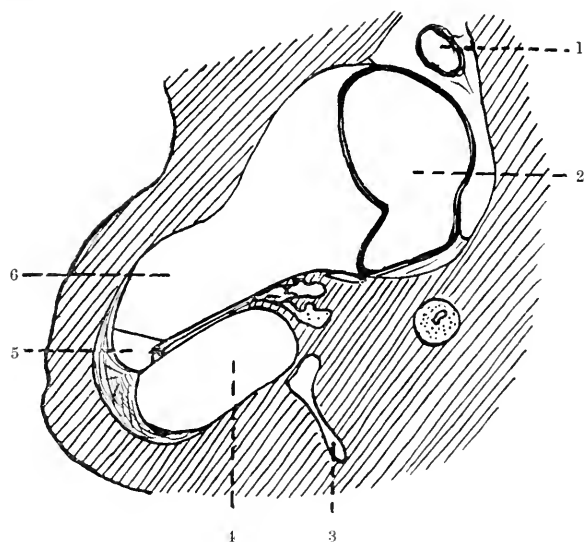


FIG. 13.—Slide 243.

FIGS. 13-19 —Camera lucida drawings showing the ductus reuniens. Slides 243 and 252 are drawn at a low magnification. Slides 267, 287, 294, 302, and 315 are drawn to scale at a higher magnification. 1. Utricle. 2. Sacculus. 3. Aqueduct of cochlea. 4. Scala tympani. 5. Scala media. 6. Communication between scala vestibuli and perilymphatic space of vestibule. 7. Ductus reuniens. 8. Lamina spiralis ossea. 9. Membrane of round window. 10. Niche of round window.

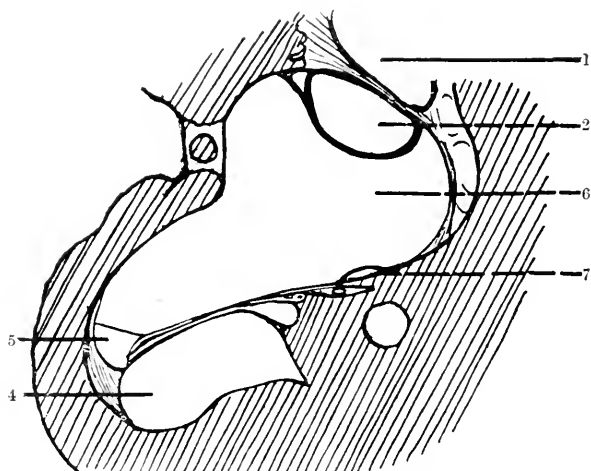


FIG. 14.—Slide 252. (See legend to Fig. 13.)

bone, but on the inferior surface, where it is in close relation to the glosso-pharyngeal nerve.

The bone immediately surrounding the labyrinth is quite distinct in structure from the rest of the petrous bone (Figs. 7 and 9), being much denser and showing interglobular spaces, which contain cartilage cells. This dense bone is developed from the foetal cartilage capsule, which encloses the vesicle. The modiolus

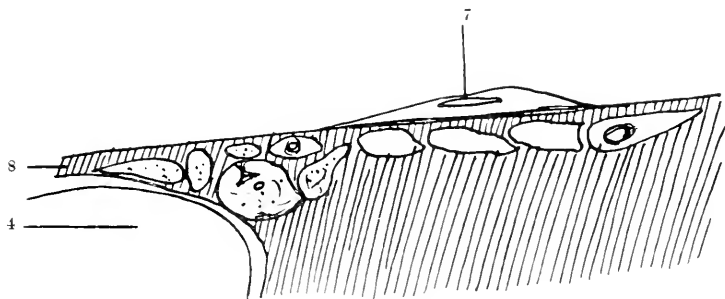


FIG. 15.—Slide 267.

of the cochlea, on the other hand, is formed of spongy membrane bone. The facial canal passes through the upper part of this capsule to reach the inner wall of the tympanic cavity (Fig. 8). The bony walls of the facial canal are composed of thin lamellar bone, which is dehiscent in parts, and is not part of the labyrinth capsule.

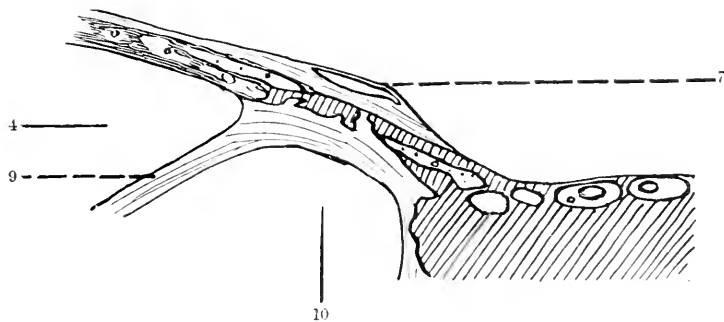


FIG. 16.—Slide 287.

The two crura of the stapes are of almost equal length, but the anterior end of the foot plate is much longer than the posterior end.

The carotid canal lies in very close relationship to the bony capsule of the cochlea (Figs. 3 and 6).

The saccule is decidedly smaller than the utricle, and the neuro-

epithelium of the sacculle lies at right angles to that of the utricle.

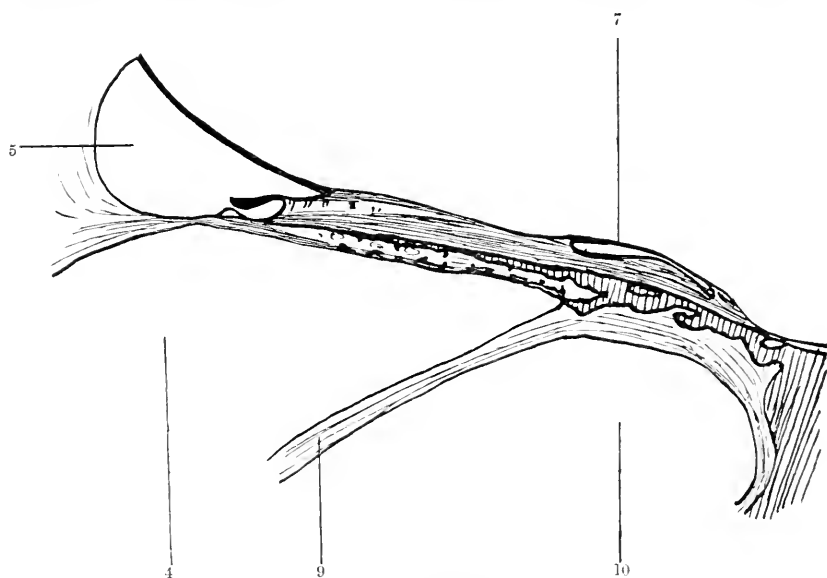


FIG. 17.—Slide 294.

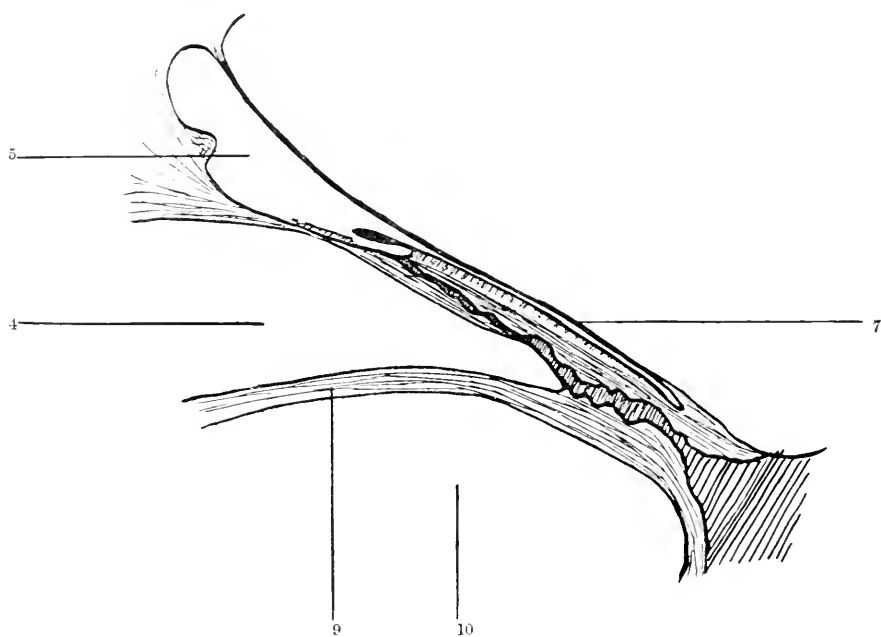


FIG. 18.—Slide 302.

The ductus reuniens is still present, and can be traced from the

inferior pointed extremity of the sacculle along the lamina spiralis ossea of the basal cochlear coil to open into the beginning of the cochlear canal within the vestibule (Figs. 13 to 19). A well-marked crista quarta is present at the point where the lower end of the utricle receives the ampullary opening of the posterior semicircular canal (Fig. 20). The horizontal canal is much shorter than the two vertical canals and has a rather wider lumen. It should also be noted that the external or horizontal canal is not horizontal, as the

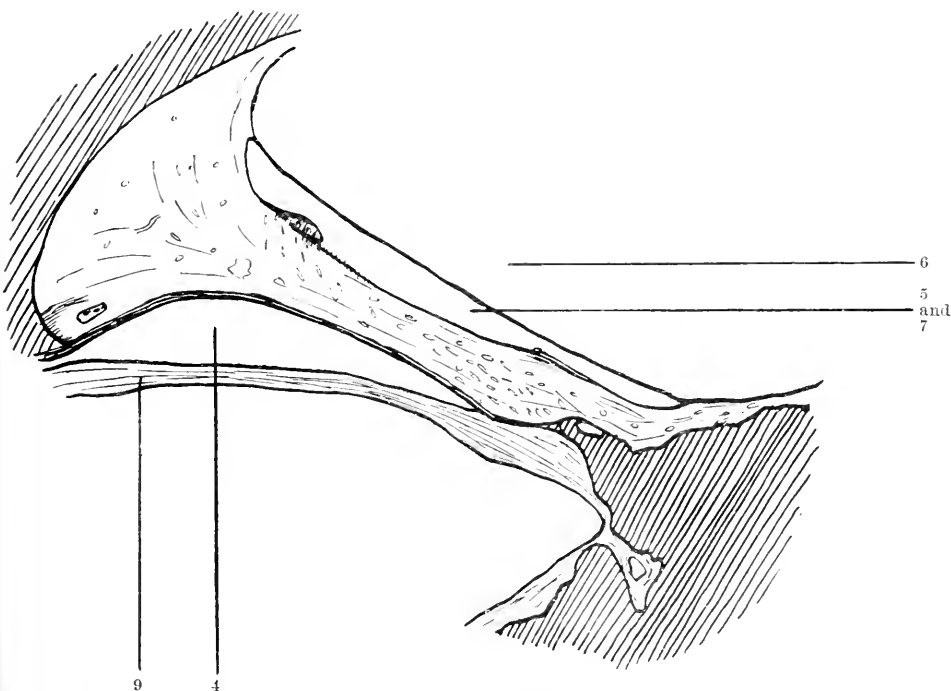


FIG. 19.—Slide 315.

smooth or inner end of the canal lies considerably lower than the outer or ampullary end.

The wide distribution of the air-cells in this specimen shows that it is not advisable in every case of acute mastoiditis to attempt to open up all suppurating air-cells. In the present instance such an attempt would have necessitated a labyrinth operation. In some specimens the cochlea itself may be almost surrounded by air-cells connected with the tubal part of the tympanic cavity.

In conclusion, we wish to state that this piece of work was carried out partly in the laboratory of the Royal College of

Physicians, Edinburgh, and partly in the Anatomical Department of the University of Edinburgh; we wish to acknowledge our indebtedness to Prof. Robinson for the use of his reconstruction



FIG. 20.—Slide 317. 1. Crista of superior canal. 2. Junction of ampulla of superior canal with utricle. 3. Perilymph space of vestibule. 4. Nucleus of labyrinth. 5. Non-ampullated end of superior membranous canal opening into utricle. 6. Lower part of utricle. 7. Crista quarta at junction of ampulla of posterior canal with utricle. 8. Neuro-epithelium (crista) of posterior canal. 9. Ductus reuniens (see Fig. 19). 10. Beginning of scala tympani of cochlea. 11. Niche of round window. 12. Promontory. 13. Head and footplate of stapes. 14. Facial nerve.

apparatus. The expenses were defrayed by a grant from the Carnegie Trust.¹

VINCENT'S ANGINA: A REVIEW OF THE PRESENT POSITION.

By WYATT WINGRAVE, M.D.

MUCH has been written by observers in different countries, many views are held as to its specificity, and there seems to be no agree-

¹ A full account of the comparative anatomy of the crista quarta by Benjamin will be found in the *Zeitschrift für Ohrenheilkunde*, 1913, Bd. lxxviii, p. 101.

ment with regard to its clinical constants beyond an unanimity in accepting the presence of spirochaetes and fusiform bodies as an essential feature in diagnosis. Nevertheless a fusospirillary lesion of the tonsil is widely accepted as Vincent's angina, and this may be provisionally accepted as a short definition of the disease.

The remarkable prevalence of spirochaetal ulceration of the tonsils in our soldiers, both in officers and in privates, affords a fitting opportunity for a perspective review of the subject.

An exhaustive analysis of all that has been written is not called for. Three contributions, however, will serve as guide posts. In 1898 Moure, of Bordeaux, graphically described an ulcerative tonsillitis from its clinical aspects, while Vincent, in the same year, described a "special form of diphtheroid angina characterised by spirochaetes and fusiform organisms." Similar bodies had been referred to by Rauchfuss, of Petrograd, in 1893.

An exhaustive clinical and pathological account of the disease was afterwards published by Vincent in 1905. This is now classical, and no subsequent contribution has added much to our knowledge. One of the chief obstructions to precise advance has been, and still remains, viz., the difficulties in establishing the postulates of specificity.

Many varieties or types of this disease have been described according to the different local and general features. In practice, however, it may at once be said that two distinct forms are met with: one which runs its course in a few days, another which persists for many weeks. Either may present one of the three following local types:

(1) Small multiple plaques or patches which correspond with the lacunæ of both tonsils.

(2) Solitary, unilateral, circumscribed "wash leather patch," with but slight œdema and shallow ulceration.

(3) Large deep irregular ulceration (solitary).

No one of the types is necessarily associated with either a high or low degree of constitutional disturbance. A small patch persisting through the whole attack may be attended by severe symptoms, and, conversely, a large deep ulcer may occasion but slight general symptoms.

A patch, when seen early, is easily detached, but rapidly reforms. Later it bleeds readily on removal of the slough, which generally comes away *en morceaux*, and not *en masse*. It is usually elevated, sharply circumscribed, but irregular in outline, and as the greyish slough becomes detached a ragged necrotic area is

seen on which a new slough is soon formed. It is therefore a superficial necrosis, not a tough, plastic exudate or membrane like diphtheria. It is soft and brittle, and when examined is seen to consist of recent and dead leucocytes, squamous epithelium, and the characteristic organisms in vast numbers. Threads or filaments of fibrin are never seen as in diphtheria. Later on, after a few days plasma cells are a striking feature when stained by pyronin-green.

In persistent cases lasting several weeks the ulcer is striking in its appearance. It is generally on one tonsil only, for but few instances have been reported of ulcer on the lingual tonsil. It is deeply excavated and ragged and it bleeds readily on detaching the surface slough, which is of a dirty grey colour, while the surrounding tonsil may appear normal.

The factor is unmistakable. Usually there is no pain, the patient being hardly aware of its existence. Such cases are often accompanied by troublesome pyorrhœa alveolaris, and it should be noted are not uncommon in those suffering with syphilis, an important point in diagnosis and treatment.

Vincent's angina may therefore be considered not only polymorphic in its appearance locally, but also to present wide variation in constitutional disturbance, which is however on the whole, not so constant, profound, or characteristic as in diphtheria, or in the acute *non-ulcerative* forms such as peritonsillitis, etc., for in most cases of Vincent's angina the constitutional disturbance and local pain are remarkably small in proportion to the aggressive appearance of the ulcer.

DIAGNOSIS.

With but slight elevation of temperature and with great depression, Vincent's angina may at first be mistaken for diphtheria, especially when the patches are bilateral. But great depression is very rare. A swab, however, will quickly settle the question. The patch does not show much increase in size, and if bilateral never extends across the middle line; further, it remains fairly circumscribed.

Occurrence in soldiers naturally excites suspicion of a graver lesion, so much so that a Wassermann test may be called for supplemental to the swab, even when it shows only few *Spirochæta fetida* and fusiform bodies. But most of the military cases occur in recruits, both officers and men, who, taken recently from civil life and often sedentary callings, are thoroughly exhausted by the

hard preliminary "fitting-up" work. In fact they are over-trained and need a short rest.

In these cases especially one of the most important and characteristic features in diagnosis is the *fœtor*. This is constant, and may justly be held pathognomonic, for it is a striking characteristic of this particular spirochæte wherever it may flourish—ear or throat, brain or lungs.

Spirochætes may occur in many of our "hospital" throats, which are for the most part strepto- or staphylo-coccal, but they are rarely attended by ulceration and deep necrosis.

From ordinary lacunar tonsillitis there is no difficulty in diagnosis. "Vincent's" patches are generally single and large.

The intense odynphagia and severe dysphagia of peritonsillitis are rare.

In uncomplicated "Vincent" the temperature and constitutional disturbance are not severe, but when associated with a pyogen, such as streptococcus, both may be profoundly affected. Early prostration, pallor, cardiac and renal troubles, however, rarely, if ever, occur. Should ulceration persist a moderate degree of pallor and anæmia often occurs. But this is not seen at the onset.

Gland enlargement is rare, and when marked is due to supplementary pyogenic infection.

Healing generally begins in the ulcer on the fourth or fifth day, and all signs may be gone at the end of a week. But in many cases a grey or yellow fœtid crater may persist for several weeks, occasionally leaving a permanent scar or depression.

It may here be said that *Spirochæta pallida* rarely occurs on the surface of a throat ulcer, and never in such vast numbers as Vincent's. It is only found by long and tedious search. It is not a surface organism, but lives deeply in the lymph of the diseased area, therefore is better found by "needling" and examination of films by silver colloid staining.

It is difficult to "needle" a tonsil, but the nearest enlarged gland will yield reliable films, as an alternative to Wassermann when in doubt as to the presence of both spirochætes. Vincent's spirochæte is superficial in its distribution and easy to find, while the *Spirochæta pallida* is deeply situated and difficult to find.

THE MICRO-ORGANISMS OF VINCENT'S ANGINA.

Without prejudice to any view as to specificity it may at once be stated that the presence and predominance of certain micro-organisms—a spirochæte and a fusiform rod—is accepted as an

essential to the diagnosis of Vincent's angina. Other organisms are usually present, both saprophytes and pyogens, but in smaller number.

The *spirochæte* varies considerably in size and shape, but possesses many features, which readily distinguish it from the specific *Spirochæta pallida*. Usually it is slender and undulating, with from four to eight coarse unequal curves, the ends being pointed or sharp. When blunt this may be due to fracture on making the film. When the matrix is dense it may be looped, coiled, slightly sigmoid, or even straight, single, or in bundles. The length, which varies from 10 to 20 microns, depends upon the closeness of the curves. It is not a spirillum formed by jointed "commas," being apparently homogeneous throughout, but differential staining will sometimes show "beading." Cilia are not demonstrable. In thin wet films they may be even seen without staining, either by simply altering the position of condenser and aperture of the diaphragm or by using oblique illumination (dark ground).

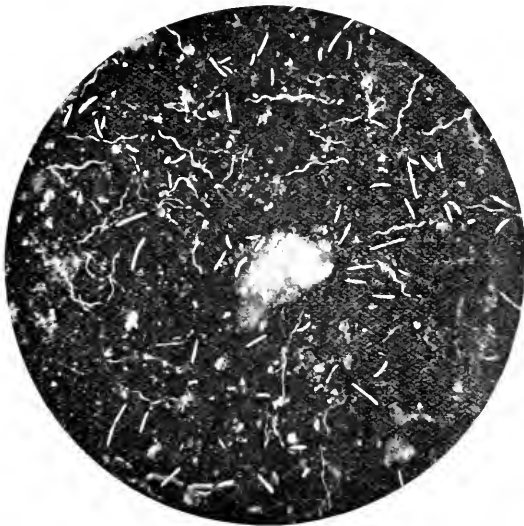
Stained or unstained they present a distinct contrast to the smaller and finely coiled spirals of the *Spirochæta pallida*, which resembles a closely twisted wire spring, Vincent's being more like an eel or a whiplash (see figure), its curves being coarser, fewer, and less symmetrical. Although many variations in size may be seen even in one field, Vincent's attains to a much greater size and thickness than the *pallida* ever does. If kept moist and warm, both show active motility for many hours, but cease at once in the presence of tricresol or formalin.

The *fusiform body* is but sluggishly motile and appears as a straight, bent, or "boomerang"-shaped rod, with tapering ends. It varies in size and form, but is always thickest at the equator. It may occur singly or in pairs, end to end, and is often marked by deeply-staining bands or beads adjoining the clear equator. Occasionally, short or blunted forms are seen, but the prevailing shape is fusiform, more or less bent, even like a boomerang. The equatorial unstained cleft is well shown by acid-fuchsin or thionin stain, but cilia are not demonstrable. It is entirely different from the spirillum of Miller or the comma bacillus of Koch, and is probably not a true bacillus.

Both these bodies are Gram-negative, but the fusiform stains the more deeply.

They can be seen by positive or negative staining, or in wet films by oblique illumination.

Many positive stains are described. The popular Giemsa gives fair results, but being slow it is liable to deposit as granules and so hide the real form, but whatever stain be selected over-staining of other elements is necessary in order to see the spirochætes well. One of the simplest methods is to fix a thin spread or film by radiant heat. Wash with acid alcohol, then stain deeply with gentian aniline violet, mordant with iodine solution and simply wash with slightly acidulated *water*. This shows the spirochætes well, but everything else is over-stained. If washed with acid alcohol the equatorial unstained band is well seen in the



Typical film from tonsil ulcer in Vincent's angina. *Spirochæta fetida* and fusiform bodies. Negative staining by silver colloid. Obj. $\frac{1}{12}$ in.

fusiform. Hot carbol-fuchsin, followed by a quick and weak alcohol bath, will demonstrate details. By far the quickest and easiest method is *negative* staining. After fixing the film by radiant heat, quickly flood the slide with 5 per cent. solution of collargol in distilled water. Stand it upright to drain and dry in the incubator for five minutes. On no account must it come into contact with a flame either before or after staining, for, if heated, it will show fissures which resemble spirochætes. When dry the film is a dark plum colour. Under a $\frac{1}{12}$ in. immersion lens the organism is seen clear and unstained on a yellow or bronzed ground (see Fig.). This method affords an excellent picture, far better than does Indian ink (Burri's), whose granules are too coarse. The secret of success is using a dried and thin film, and speed in flooding without

heat. Dark ground illumination of wet film is not recommended to the inexpert, but much can be seen even by gradually narrowing the diaphragm of an ordinary microscope or depressing the condenser.

This colloid stain also brilliantly illuminates skin bacterial forms, which can be easily identified, such as streptococci, tetrads, cocci, staphylococci, leptothrix, yeasts, etc., but for Klebs-Loeffler, and other specific bacteria, special positive staining and cultivation is necessary for unequivocal diagnosis.

Positive "deposit" staining by precipitation of silver (Levadi, etc.) is tedious and unreliable for films, but gives excellent results when the spirochaetes are in tissues.

When seen alive, spirochaetes are always more spiral in appearance than in stained films; in fact, the *Spirochæta fetida* when very small and active may appear so closely coiled as to occasion doubt in differentiating it from *Spirochæta pallida*, which is much more rigid and screw-like in its movements. The *Spirochæta fetida* is decidedly undulating or eel-like in action.

Although it is usual to find spirochaetes and fusiform bodies together, their relative numbers vary in the different stages of the disease. Early in the disease, fusiforms are perhaps more numerous, but when the slough is fully formed spirochaetes undoubtedly predominate, becoming relatively fewer as healing progresses and factor disappears.

Too much importance must not be placed upon absence of "fusiforms," for, at the height of the trouble many fields examined will show only spirochaetes with a few coccal forms. So that their absence in a "surface" film from a suspected Vincent's ulcer does not justify doubt as to the exact nature of the spirochaete, notwithstanding the important point that they do not accompany the *Spirochæta pallida* in "needlings."

DISTRIBUTION.

The spirochaetes of Vincent's disease, unlike those of syphilis, are essentially superficial, being confined either to the surface of the tonsil or to its crypts. Their occurrence in the deep structures—lymph pulp or nodules—is extremely rare, even in noma. They are, however, not restricted to the throat. The nose, the accessory nasal sinuses (especially when necrotic), the gums, decayed teeth, the middle ear, meningeal and cerebral abscesses, cerebro-spinal fluid, gangrenous lung, venereal buboes, and even the cellular tissue of the neck and mediastina following tonsillectomy have each afforded plenty of spirochaetes, doubtless conveyed directly by the

lymphatics, and not by the blood-stream. In cases of cerebral hæmorrhage, when the breath often early assumes a very fœtid character, spirochætes are abundant in the mouth and throat, probably only a temporary increase of normal inhabitants under conditions specially suitable to their habits.

In noma they have been demonstrated somewhat deeper than in Vincent's ulcers, but still limited to the necrotic zone, which suggests that they simply follow the death of tissues rather than precede or actually cause necrosis. They certainly get into the lymph-stream, but cannot survive in the blood. As they are almost invariably accompanied by pyogenic organisms, their own pathogenic properties or powers are difficult to estimate. This is a problem strikingly shown in middle-ear disease and its intracranial complications, for in the majority of chronic cases spirochætes occur in vast numbers with various pyogens—streptococcus, staphylococcus, and *Bacillus pyocyaneus*.

It may here be mentioned that spirochætes are rarely present in true pyorrhœa alveolaris.

Although the writer has systematically examined the blood in these cases he has never found spirochætes in it, except *post-mortem*. The only variation from normal was a decided increase in oxyphile leucocytes, some cases showing 4 per cent.

LIFE HISTORY AND CULTURE.

Systematic examination of the mouth and throat shows that spirochætes are rarely absent, even in those who are apparently healthy and whose teeth and tonsils are normal. This, however, applies only to adults, for in *healthy* infancy and childhood they are somewhat rare. In the adult, therefore, they must be accepted as constant saprophytes. If a scraping be taken from the tongue or fauces of a healthy adult during the daytime very few or none at all may be found; but if collected soon after waking in the morning, or before breakfast, they are easily seen, but not in the vast number of Vincent's disease.

They are undoubtedly symbiotic in their habits, for they are not only found in a crowd of saprophytes, but their most successful artificial cultures were on a diseased tonsil swarming with other organisms. They certainly prefer conditions associated with fœtor and putrefaction, such as chronic middle ear discharge, protracted cerebral abscesses, fœtid buboes, balanitis, vaginitis, etc.¹

¹ This peculiarity is shared by the *Spirochæta pallida*, the writer having found them in abundance accompanying tertiary necrosis of the nasal septum.

In spite of their luxuriant growth *in situ*, artificial culture is very difficult. They will not grow upon the routine media or under the usual conditions, and experience shows that they must be looked upon as preferential but not obligate anaerobes. Upon ordinary agar or serum, filaments certainly do appear in from a week to ten days, but they generally die before reaching the spiral stage. Normal blood is unfavourable, but they flourish in presence of reduced hæmoglobin. For instance, they are specially numerous in cases which suffer from venous leakage in the throat and mouth, whose breath is very fœtid. Satisfactory cultures are best obtained by imitating as far as possible their usual habits. An amputated tonsil is inoculated from a swab, then placed in sterilised fœtid broth and covered with liquid paraffin which sufficiently excludes the air. Although this method is somewhat unorthodox, in a measure it simulates their natural habits, and has proved more successful than any routine course. Even by this process undulating filaments were more numerous than the characteristic twisted forms found *in situ*.

Precise accounts of inoculation experiments and research are not available.

CONCLUSIONS.

Notwithstanding the various types, forms, and degrees of acute and subacute ulcerative tonsillitis or Vincent's disease, our unbiassed perspective affords sufficient evidence that it is a disease *sui generis*. That the striking presence and preponderance of spirochaetes attended by fusiform bodies is more than a mere coincidence must be admitted, but in view of the presence of these or similar organisms in many other conditions associated with fœtor, together with the fact that the necessary postulates are not forthcoming, one must hesitate to accept the spirochaete as causal or specific. The presence of spirochaetes is the predominant feature; this, with fœtor, is wanting in all other conditions which simulate Vincent's angina. One, therefore, naturally asks: Is it infectious? At first it would seem to be so, as it appears to possess epidemicity. But there is no positive evidence of its contagiousness, for even the present prevalence in soldiers is more than likely to be accounted for by factors other than bacterial. It is almost entirely restricted to young and over-trained men; old and well-trained soldiers are rarely attacked. In civil life no community, rich or poor, is specially selected, and cases are chiefly sporadic. The cause must, therefore, be sought in the individual rather than the community.

No adult mouth or throat is free from the organism even in health, and any diminution of resisting power may favour spirochaetal activity. This is well seen in cases of cerebral apoplexy. Further, the organism itself is extremely delicate, and only lives with difficulty outside the body, so that until inoculation evidence is available contagiousness cannot be accepted, for such an emphatic conclusion is not supported by clinical evidence.

The suggestion that Vincent's angina is an attenuated variety of noma must be viewed in the same spirit.

A few words are necessary with regard to treatment based upon pathological experience.

Experiments *in vitro* and *in vivo* conclusively show that trikresol and formalin are the most reliable antiseptics when dealing with spirochaetes, and may be used with full confidence. Iodine, silver nitrate, chromic acid, ferric chloride, and phenol, notwithstanding their popularity, are unhesitatingly condemned. Hydrogen peroxide, perborates, and permanganates, although useful as adjuvants, are not thorough in their action.

Trikresol, 5 per cent., in alcohol may be freely and frequently applied to the ulcer without any fear of toxic results, and diluted with water to 0.5 per cent. may be used as a mouth douche. Formalin is best used as lysoform, either pure or diluted, in the same way. A very pleasant addition to either is English oil of lavender, 0.5 per cent., to the alcoholic solution.

As an astringent zinc permanganate, 1 gr. to $\bar{3}$ j of water, is preferable to all other permanganates.

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TONSILLECTOMY BY BLUNT DISSECTION UNDER LOCAL ANÆSTHESIA.

BY JAMES B. HORGAN, M.B., B.Ch.,
Laryngologist to the North Infirmary, Cork.

FROM the experience derived in the performance of this operation in well-nigh 200 cases under local anæsthesia, the writer is of opinion that whenever tonsillectomy by blunt dissection is the operation of choice or necessity, it should, in the absence of any special contra-indication, be invariably performed under local anæsthesia.

The following is a brief summary of the technique which experience has proved to be most satisfactory :

Fifteen minutes before coming on the chair the patient is given a hypodermic of morph. sulph., gr. $\frac{1}{4}$, and atrop. sulph., gr. $\frac{1}{120}$. The fauces are first anæsthetised superficially by the application of a 10 per cent. solution of cocaine applied by means of a small piece of cotton-wool on a carrier. Two or three drops of the solution, to which a drop of liquor adrenalin has been added, will suffice for this purpose.

I now come to what I consider to be the most important part of the process, and upon the success or failure of which the painlessness or otherwise of the operation must ultimately depend. By means of a syringe of suitable length I inject up to 15 c.c. of novocain solution around each tonsil. The solution used is made by dissolving two tablets, each containing novocain, 0.1 grm., and suprarenin, 0.00025 grm., in 30 c.c. of sterilised normal salt solution. The tablets used for this purpose are put up in tubes by Messrs. Meister Lucius & Brüning. A $\frac{1}{2}$ per cent. solution of cocaine, to which a drop or two of liquor adrenalin has been added, would also attain this result, but toxic symptoms would be more apt to result. I have never seen any alarming symptoms manifest themselves, though I have often injected as much as 40 c.c. of the above-mentioned novocain solution. Patients not uncommonly complain of a momentary embarrassment of respiration, and state that they "feel the heart thumping." The object aimed at by making this injection is to obtain an infiltration of those tissues immediately surrounding the tonsil, thereby tending as far as possible to isolate the gland. It is remarkable how well this result can be attained by a little practice, even in the case of the most embedded tonsil. The needle, if a straight one, should, as far as possible, be inserted

in a direction vertical to the free edge of the palatal arch, and it should not be made to penetrate more than 1 or 2 mm. If it be correctly inserted the mucous membrane will, when the fluid is injected, immediately rise in the form of a bleb, which tends roughly to follow the direction of the faucial pillar. If the injection has been successfully carried out, the tonsil will finally present a shrunken appearance surrounded by a pale œdematous collar.

At this stage the patient is allowed a few minutes' respite. If questioned the voice will be found very indistinct, or an inability to phonate may be complained of which will require a reassurance from the surgeon.

The operation may now be undertaken without undue haste; the patient, though he suffers some discomfort, will not experience or complain of any pain, and the hæmorrhage will be remarkably slight.

I am in the habit of operating with the patient in the sitting position, the head being fixed against the seat in such a manner that the face is looking slightly downwards. By this means blood and saliva, following the course of gravity, tend to flow forwards and are collected in a soft rubber receiver, which is suspended around the patient's neck. This position of the head, if insisted upon, will obviate the coughing expectoration and laryngeal spasm, which are otherwise such disturbing factors both for the patient and the surgeon.

To grasp and firmly retain the tonsil the writer has found no instrument so useful as a forceps suggested by Halle, which is an exact replica, on a larger scale, of a Spencer Wells artery forceps, and about ten inches in length. With this instrument and a McKenzie blunt dissector, it has been found possible to enucleate any tonsil in between thirty to sixty seconds, though speed is not at all requisite when operating in this manner.

After the swollen anterior pillar has been drawn aside by any suitable forceps a firm deep grasp of the tonsil is taken in its upper and anterior segment. By maintaining a firm inward tension the plica will be put on the stretch, and little difficulty will be experienced in splitting it with the dissector and making a clean opening into the extra-tonsillar region. The dissector should first be worked in an antero-posterior direction, after which, by a strong upward sweep of the instrument, the upper pole of the tonsil may be cleanly and totally evulsed. The lingual pole of the tonsil, which is often difficult of complete severance with the

dissector, may be divided by a suitable scissors or a snare after it has been sufficiently defined.

I finish the operation by insufflating a small quantity of a powder, consisting of equal parts of iodoform and boric acid, on to the raw surface as soon as it has been ascertained that all hæmorrhage has ceased, and I find that by this means the tendency to subsequent pyrexia and sepsis is diminished.

After the operation the patient is kept for six hours well propped up in bed. It is the duty of the attendant during this time to make sure that the patient is not unconsciously swallowing any appreciable quantity of blood. To this end the patient must be got to expectorate at intervals, and the surgeon should examine the pharynx with the frontal mirror for signs of latent hæmorrhage before the patient assumes the recumbent position. If such simple precautions be adopted the operator will insure himself against the unpleasant experience of being suddenly called to find his patient has vomited a large quantity of blood and is in a collapsed condition.

After operation the patient should be confined to bed at least three days, and should avoid all potential sources of infection for another three. A peroxide gargle or spray should be used until all soreness or sloughing have disappeared.

Post-operative hæmorrhage occurred in nine of my cases. In seven of these a hypodermic of morph. sulph., gr. $\frac{1}{4}$, combined with ergotin citrate, gr. $\frac{1}{100}$, and a calming of the restlessness and anxiety usually exhibited were sufficient to bring the hæmorrhage to a stop. In two cases I found it necessary to clamp the faucial pillars with a couple of metal clips (Michel). These clips, though they were found very potent in controlling hæmorrhage, should not be used without undue necessity, and should be removed on the following day, as apart from the pain attending their use they cause considerable œdema and increase the risk of sepsis. If the pulse was inclined to fail I found it was readily restored by the administration of a rectal saline. The only other noteworthy complication met with was a cervical adenitis of variable intensity in five of my cases, all of which readily responded to ordinary antiphlogistic remedies. Pulmonary complications were entirely absent.

The youngest patient operated on in this way was a boy, aged ten, who had previously had tonsillotomy performed, and the oldest a man aged sixty-nine (unilateral).

The following are the advantages claimed for local, as against

general anæsthesia, in the performance of this operation: The relative ease and deliberation with which the operation may be performed. The exclusion of all those risks, both immediate and remote, which attend every operation on the upper respiratory passages under general anæsthesia, and the avoidance of post-operative vomiting, with its exaggerated discomfort, for such a patient. The hæmorrhage is out of all proportion less and easier to control. It must further be remembered that in either case the chief discomfort the patient is called upon to endure is the dysphagia succeeding operation—a factor which the preceding anæsthesia has no power to influence.

General anæsthesia has, as far as the writer is aware, no counter-advantages to offer.

SOCIETIES' PROCEEDINGS.

PROCEEDINGS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

Held in Atlantic City, New Jersey, May 25-27, 1914.

(Continued from p. 442.)

Symposium.

Empyema of the Nasal Accessory Sinuses in Children.—**Lewis A. Coffin** (New York).—It is remarkable that although case after case of affection of the accessory sinuses in children has been recorded by rhinologists, no mention whatever is made of it in the text-books devoted to pædiatrics. As a consequence, many cases that have advanced to the suppurative stage might have been prevented and saved much suffering had an early diagnosis been made and proper treatment instituted. In acute conditions, when there is a copious discharge which may be washed out or otherwise cleared of secretions, if negative pressure is applied to the nostrils and more pus or mucus found, we may be quite sure that it comes from some of the accessory sinuses.

Children subjected to the test showed streptococci, staphylococci, and pneumococci.

The safest form of treatment is in the use of the post-nasal douche. The writer has found great satisfaction in treatment by negative pressure (suction) and the use of autogenous vaccines.

The Pathology of Acute Sinusitis of Children.—**George B. Wood** (Philadelphia).—The pathology of acute sinusitis is influenced by the severity of the infection and by the resistance of the patient, and upon these two factors depend the degree of inflammation. The characteristic changes found in the mucosa in the mild cases are: congestion and slight œdema of the connective tissue, increase in the number of

beaker cells in the epithelium, and slight increase in the number of lymph cells in the superficial layers of the connective tissue. In the more severe cases the œdema is increased, the congestion is more severe, and the extravasation of the red blood cells into the connective tissue stroma becomes so intense that the condition resembles a subepithelial hæmorrhage. The leucocytic infiltration is marked, but still only involves the subepithelial layers of the connective tissue. Only in the very severe cases does the whole connective tissue layer become infiltrated so that the periosteum is attacked. Infiltration of the periosteum is very apt to be followed by bone changes. In diphtheria, sinus involvement is frequent, though the majority belong to the mild catarrhal group. In scarlet fever, sinusitis is less frequent, but more severe, so that bone involvement is quite common. Other infective diseases show nothing peculiar or characteristic.

The Surgical Treatment of Empyema of the Nasal Accessory Sinuses in Children.—C. G. Coakley (New York).—The writer is convinced that inflammation of the nasal accessory sinuses occurs as frequently in children as it does in adults. As the sinuses are undeveloped, there is a greater tendency to spontaneous cure.

General anaesthesia is necessary for examination, if under five years of age. Transillumination is valueless under ten years of age. In mild cases suction may be used to advantage. Cases requiring surgical treatment have either a swelling over the antrum or around the orbit. The antral cases are almost always associated with an osteomyelitis of the superior maxilla, and are operated through the canine fossa with a counter opening in the nose.

The orbital cases, if mild, are kept in bed with cold compresses and frequent instillation of a 1 per cent. solution of cocaine and a 1/20,000 solution of adrenalin. The severer type requires immediate operation of ethmoid and sphenoid exenteration through the external route.

A probe is passed into the frontal sinus, and the diseased membrane must be removed lest there be recurrence; the wound should be left open. There is no consequent deformity.

HARRIS P. MOSHER: It is hard to get data on the development and the size of the accessory sinuses in children. Very few bodies of children find their way into the dissecting room, and children make poor subjects for X rays. Occasionally, however, we do get an X ray, or have a chance to investigate the sinuses at autopsy. In such instances I have usually been surprised at finding the sinuses larger than I anticipated. This is especially true of the sphenoidal sinus. In one case, a boy of twelve years, the sphenoid was of average adult dimensions. Most of us, therefore, have to go for our information to the men who have been fortunate enough to have material for making observations upon the sinuses in children. Onodi, who has published a book on the "Accessory Sinuses in Children," is our chief authority. I have roughly traced some of his plates and grouped and chartered his findings. They help to visualise his results. Also, I examined ten X rays taken of children's heads, in cases where there was a question of fracture of the skull. According to Onodi, less is accurately known about the maxillary sinus than about the others. Investigation seems to have been focussed upon the frontal sinus and the ethmoid cells. The antrum appears in the fourth month of foetal life, and at birth is a *cul-de-sac* about the size and shape of half of a coffee bean. Tooth buds take possession of the body of the superior maxilla and give the antrum but little room until the second dentition.

At this time the antrum enlarges quickly. Another important observation in connection with the antrum in young children is that it is best approached from the nose through the middle meatus. There is but little space under the inferior turbinate, and the wall of the antrum there is much thicker than in adult life. The ethmoidal cells are present at birth, two or three posterior cells, and a like number of anterior cells. The posterior are the larger—a distinction which they retain throughout life. The ethmoidal cells increase rapidly in size, relatively much faster than the frontal sinus or the sphenoid. At the thirteenth year the ethmoidal labyrinth is of adult width, and the cells nearly, if not actually, of adult size. An X ray taken at this period is striking, because the ethmoid labyrinth is wide and apparently fully developed, whereas the frontal sinuses (in comparison) are small. There is no frontal sinus at birth; only a comma-like fossa at the summit of the unciform groove, which by upward growth is to make the sinus. By the third year the frontal sinus is peeping above the level of the cribriform plate; the sixth year the height and width may measure 10 and 10 mm. The frontals grow very unequally. Onodi figures one case of an eight-and-a-half-year-old child in which an adult sinus was present. From ten to fourteen years it is common to find what might be classed as a small adult sinus. I have tracings of a sinus at ten years, and of one at fourteen years, which illustrate this. The last accessory sinus is the sphenoid. At birth this sphenoidal sinus has a well-formed ostium and a small cavity. By comparison the frontal sinus at this time is far behind the sphenoidal in development. The order in which the sinuses enlarge seems to be roughly as follows: From birth to the third year the ethmoidal cells have the lead; then the sphenoid starts to enlarge actively; at the sixth year, or the period of second dentition, the antrum becomes active, takes the lead, and ever afterwards holds it. From the sixth year also the frontal sinus, the laggard of the sinuses, increases rapidly. The gist of the matter is, that from the third year there is an antrum large enough to permit of surgical treatment. The same is true of the ethmoid labyrinth from six years onwards, and of the frontal from the eighth year. From the third year a surgical sphenoid may be expected. Precocious development of the sinuses may make any or all of the sinuses of surgical size before the periods just mentioned.

THOMAS HUBBARD: I should like to speak of three or four types of cases which have come under my observation of acute sinusitis in children. First, a young child of six years of age with orbital abscess following measles; this case was seen some time after the initial attack, and there was a sinus which had ruptured through the orbit, and although the child was in good general condition, the parents refused operative interference, yet nevertheless the child recovered. The second is one of the fulminating types of scarlet fever in a girl exposed to cold after the initial symptoms of fever, and she suddenly developed acute general sinusitis. Within forty-eight hours there was coma, and death inside of three days. That was one of the cases which are absolutely inoperable. The third type is of scarlet fever of less malignant character, but the initial symptoms were otitis media; prompt paracentesis; the next day symptoms of marked pharyngitis, and following that the rash and typical symptoms of scarlet fever. Although this child was in the best of hygienic surroundings, with the best of nursing, the ear went on to a suppurative mastoiditis, and a mastoid operation was necessitated about the third week. General sinusitis on both sides was developing with gradually increasing severity; the symptoms were typical and worse on

the side of the involved ear. This boy was at that time seven years of age, and the right sinus seemed to reach the maximum of inflammatory disturbance, then gradually subsided. This gave me hopes that the left side would follow suit, but the general systemic disturbance necessitated a general operation upon the left sinus about three weeks after the mastoid operation. A complete radical operation was done, modified. The frontal sinus was involved only in its lower portion, and consequently there was no opening above the orbital ridge. Complete ethmoid exenteration. Probably the sphenoidal sinus was also opened, as was the maxillary antrum, which was thoroughly cleaned out. Three or four days of marked improvement followed, then a relapse with a gradual rise of temperature. Autogenous vaccine, made from the granulations taken from the ethmoidal cells, was given, with exacerbation of temperature for about forty-eight hours, then marked improvement and complete recovery. The patient was under observation for five years with several severe attacks of rhinitis, but only last winter did he again develop any symptom of pus in any of the sinuses, so that it was necessary to wash out the antrum for a few days. It then subsided. Another case is of the subacute type, in a child of six years, brought up on the floor of a basement; he had a succession of acute attacks of coryza, finally resulting in a general suppurative sinusitis involving all the cells on both sides. This boy was treated according to the method suggested by Dr. Coffin. It was impossible to irrigate the antrum more than about six times, for after that it produced such a nervous shock that it had to be discontinued. Negative pressure was undertaken every day, about three pounds, to withdraw the pus, which was considerable, and after each treatment he would be very comfortable for some hours. There was more or less purulent bronchitis in this boy. We were finally driven to operate, but his condition was so critical that I limited it to an opening from the maxillary antra into the nose. Within twelve hours after operation his temperature was 103.5° F., and he developed a broncho-pneumonia, and I am thoroughly convinced that a prolonged operation would have resulted in death. The antra have since remained comparatively clear, there now being natural drainage, yet eventually, as soon as his condition warrants it will be necessary to perform a complete exenteration of the ethmoids.

EMIL MAYER: There seems to be another class of cases of this affection in children between the two types as mentioned by Dr. Coakley, of moderate inflammation and infiltration of the orbit, and of the severest type, and I have recorded such an instance and found to my surprise that all the other cases of a similar kind recovering had the same train of symptoms. All the patients were in the neighbourhood of from three to five years of age, and all had the following conditions: an opening or perforation directly under the eye about half an inch, an ectropion, and foul-smelling discharge. A probe dropped into the opening over the zygoma went into a cavity and turned toward the nose and was easily pushed into the nose. In my own case an external operation, consisting of linear excision, curetting, and drainage through the nose, was followed by complete cure.

WILLIAM E. CASSELBERRY: I wish to speak of a chronic type of case, particularly of a conservative operation which I have found feasible. They affect children anywhere from nine to fourteen years of age. It is the kind of case you see frequently even in older people—nasal polypi in the middle meatus, polypoid enlargement of the middle turbinate, and pus in the antrum and anterior ethmoidal cells, and sometimes in the posterior ethmoidal cells. These polypi, if removed one week, will be

there again the next week, developing with extreme rapidity. It removed, however, together with the greater part of the middle turbinate and at the same time you go a little higher and take the floor of the anterior ethmoidal cells, they do not return within the month, as before. This operation I have found feasible in a limited number of cases under cocaine anæsthetic. Occasionally I have had to give a general anæsthetic. I recall one which resulted in such an amount of recovery that it has required no further operative procedures. The subject was impressed upon me by a child upon whom I did not perform such an operation, and in whom I should have urged either an external or an internal operation under a general anæsthetic. She was a beautiful girl, in whom to propose any external procedure to the parents would have seemed like sacrilege. I removed, in the fighting child, polyps from time to time as best I could without middle turbinectomy. I cauterized the nose and washed the antrum. The thing went along for three or four years, when, as she was travelling on the Rhine, she became suddenly seized with a severe headache, was taken off the boat to a hotel, and put under the care of an English surgeon, who said she had meningitis, and she died within a few days. There is always this menace, even in children, and I believe it our duty to establish internal drainage. I do not believe it our duty to establish that drainage instead of doing an external operation if such seems necessary. But in many cases internal drainage will be quite sufficient.

ROBERT C. MYLES: The fundamental principle of these chronic cases, in my opinion, is the securing of proper drainage, and this resolves itself into a surgical mechanical proposition. I think we have been a little conservative in not teaching more frequently these intra-nasal operations on the ethmoid and antrum of Highmore, in children under puberty. It is astonishing how a child can be trained to allow you to do it under cocaine. I have started by opening the ethmoidal cells, and before finishing have succeeded as well as though the patient were a grown person. I have used cocaine frequently hypodermically, and in this way it renders the operation quite painless if injection be made into the middle turbinal region. The exenteration of the bulla ethmoidalis and the anterior ethmoidals has frequently been most successful. I believe we will be able a little later to open the antrum more successfully by enlarging the hiatus semilunaris and enlarging the upper lobe and securing drainage in that way, doing no permanent harm, but effecting permanent drainage, and thus pave the way for the future irrigation if necessary. In a case of mucocele, if you make a permanent opening through the nose you will get the best results. In cases of chronic suppuration, those preceding atrophic rhinitis, it has been my custom to find the drainage fairly good. I have used in conjunction with other treatment a powder of aristol and boric acid, insufflating half a grain once a day into the nose at night; and I do not know whether it is the iodine generated from the aristol or what it is, but it seems to me that the causal factor of suppurative rhinitis, which terminates in atrophic rhinitis, is sometimes completely arrested. In conjunction I use ichthyol as an ointment.

G. ROSS SKILLERN: It is astonishing how few cases have really come under observation and been diagnosed as such. I do not mean the acute cases, which we see in conjunction with the acute conditions, but the truly chronic cases. In the pædiatric department of the hospital with which I am connected, there are a great many cases of children's diseases, and very frequently the laryngological department is called upon to examine patients for sinus trouble, and in the last year I do not know of more than

one or two well-marked cases of sinus trouble which we have been able to diagnose. This may be due to the fact that in the sinuses in children the mucosa and the underlying bone are so intimately associated and connected that we do not seem to have the same condition as shown in the text-books pertaining to the adult, yet it seems that the cases are fulminating in type. In the operations we have done, mostly by the internal method, the bones are softened and broken down, showing a condition of infection of the entire wall of the nasal cavity of one or both sides. In some of these bad eye cases it is absolutely necessary to go into the ethmoidals, but in the majority of patients we should try the intra-nasal method first, and the conservative methods, because at the best we are working under very disagreeable circumstances.

HANAU W. LOEB: The most unsatisfactory class of case of any type that can come under our observation is that of bilateral suppuration, which, without definite proof, seems to come largely from the accessory sinuses in children. The nostril is exceedingly small, so that it is almost impossible to get a satisfactory view, the nose being really a duct, and for that reason not sufficiently developed to take care of the situation.

VIRGINIUS DABNEY (Washington): I would first refer to the symptoms in the acute cases. First, there is the high temperature, frequently 104° F., quite unassociated with influenza or bronchial trouble. This, I think, is remarkable when we remember the cause is an open empyema. Secondly, with regard to the prolonged convalescence. I have under observation a case which has been irrigated six times a day for ten days, with an immense amount of discharge. The case was not easily diagnosed; it was seen on the third day with an internist, but it was only by exclusion that we arrived at the diagnosis. Pressure on the canine fossa was painful, and also pressure over the supra-orbital ridge. There was high temperature and all the train of symptoms which are recorded as typical, after three weeks of apparent cure. Under irrigation in these cases the temperature comes down to 99° F. for ten days or so, then there is an exacerbation from a reaccumulation of pus. I would cite one case of a boy who went wading two weeks ago in a public fountain; no bronchitis; temperature suddenly shot up to 104° F. The paediatrist said he had colitis, etc. What he had was a pure infection of the antrum of Highmore, and this cleared up under irrigation.

JOHN F. BARNHILL: I believe that we should do more than we have done heretofore in enlightening the general practitioner and surgeon as to the exact cause and number of cases that may arise from sinus disease. If we attempt to find out how frequently meningitis results from these sinuses, we are greatly handicapped. I have had an opportunity of seeing a number of cases in which there was lack of fever, pain, and distress; the thing we did find being the great exophthalmos, with swelling of the lid and discharge of pus into the nose. Recently I had a child of thirteen years, in which there were no symptoms except this great exophthalmos and discharging fistula at the external angle of the eye. At operation I found the entire anterior and lower wall of the sinus necrosed, and it had to be taken away. Dr. Coakley spoke of doing a secondary operation; leaving an external drain in the cases operated on by the semi-Killian method. It seems to me that we should do this at one operation, by making the drain large enough into the nose.

GREENFIELD SLUDER: The sphenoidal sinus develops very early; specimens showed that by the completion of the second year of life the extension of the sphenoid, although scanty from antero-posterior measure-

ments, was as far as the foramen rotundum laterally, and at the sixth year it had reached the Vidian canal. Both the Vidian and the second division of the fifth nerves come closely associated with the wall of the sphenoid, and I believe this fact offers the explanation for the recurring headaches in children which are sometimes seen as early as the tenth year; and I feel more convinced than I did last year, because during the interval I have seen the sphenoid put out an eye, and paralyse the third division, where the picture showed a polypoid swelling over the olfactory fossa, completely filling it, and bathed in pus from above. In the course of twenty-four hours that polyp disappeared under shrinkage, and the last vestige of pus with it. Under constant watching no further pus was found. In that particular case the second division of the fifth nerve and the Vidian nerve took part in the pain. The treatment was satisfactory, the third division came back into almost complete function, although there is still a difference of two diopters prism. That case lost its malignant type as soon as the shrinkage took place. It was not operated upon.

HARRIS P. MOSHER: Among the cases which have come to my attention, there have been two which I could not miss; in each there was a fistula under the eye which when investigated led to the antrum or nose. Dr. Coakley's remarks regarding the slow pulse in acute ethmoiditis interested me. This suggests to me some cranial pressure, and I would like to know if that is his explanation.

LEWIS A. COFFIN (in closing): I selected the eye department of our hospital as the one in which to try out my method. I took an old aspirating apparatus with a vacuum in a big bottle, and cut off the tip of a rubber ink dropper and stuck the little end into the tube. By putting this into the patient's nose we found the dropper filling up at once. With regard to the type of case cited by Dr. Mayer, there is such a type. I have a different feeling from him on the matter. I find that it is pathognomonic of an osteomyelitis and involvement of the alveoli, and the alveoli are diseased, and if probed it will bend toward the nose and will be easily pushed in. Very possibly the antrum is diseased also. The next case any one of you have I would suggest that you make a very careful examination of the alveoli. In regard to the treatment of children intranasally, in taking out polyps, ethmoids, etc., we must differ very much in the class of children we treat. I could not do it in my patients under seven years of age; I do not own or know of sufficiently small instruments for this work. In regard to the size of the sphenoid, there is a difference in Dr. Wood's and Dr. Mosher's statements. I have had some experience and believe that Dr. Mosher, who stated that the ostium was well developed with quite a cavity back of it at birth, is correct.

GEORGE B. WOOD (in closing): I would add just a word regarding the development of the sphenoid. In my own experience I have never seen a sphenoidal cavity under one year of age which I could recognise. I have cut sphenoids in children six months of age without the slightest sign of a cavity. Others state that it becomes of surgical importance from four to six years of age, and may be recognised occasionally as a dimple on the anterior edge of the sphenoid body during the first year.

CORNELIUS G. COAKLEY (in closing): In the radiography of children there is certainly a frontal sinus well above the orbital ridge in children three years of age. One explanation may be that these children with discharge and diseased frontal sinuses may have abnormal development. As regards the instruments for intranasal work referred to by Dr. Coffin, I would state that Pfau is now making instruments identical with those

for the adult. As to the size of the sphenoid, I had occasion to operate on a child with orbital cellulitis about a year and a half old, and there was a sphenoidal cavity the size of a hazel-nut. The child died of laryngeal diphtheria three weeks later, and we proved the size of this sphenoid at autopsy. Infection is more likely to come from the frontal sinus, but in the clinic cases I have seen it has come through an orbital cellulitis. The frontal sinus has not been involved particularly, and I think that an orbital cellulitis secondary to sinus disease is the thing which is very liable to extend into the brain. With regard to the low pulse, I would say that in two cases I have examined the spinal fluid and there has been no infection, and in twenty-four hours after, through opening of the abscess, the pulse has come up and run very high, showing that the slowness of the previous rate was probably due to compression. The bone in all these cases has been of peculiar leathery consistency, requiring a forceps to get it out. I can agree entirely with Dr. Coffin in his explanation of Dr. Mayer's case. Such are due either to necrosis of the superior maxilla or ethmoid, which has ruptured spontaneously, and such cases go to the eye surgeon. These cases, so far as I have been able to determine, have usually been streptococcic. The reason I leave the wound open is because I would do so with a streptococcic infection in the mastoid, and I believe in the type of cases I am speaking of, tense, shiny glaze of the orbit, if you close the wound you are in danger of keeping up the cellulitis and producing an extension into the cerebral cavity. You frequently get no more scar following drainage, although it may be wider and redder for the first four or five months, yet at the end of the year you cannot tell whether it has been closed primarily or healed by secondary closure. I got this idea of leaving the wound open in such cases from Killian.

The Relation of the Tonsil to Thyroid Disease.—**Burt R. Shurly** (Detroit).—For some mysterious reason there exists in the State of Michigan an area in which there is an increased percentage of cases exhibiting disturbances of thyroid secretion. It is obvious that the physiology of the thyroid and other ductless glands is profoundly affected by toxic disturbances in general, and particularly those that enter by the lymphoid ring. The author has noted beneficial results after a tonsillectomy in patients who had incipient Graves' disease, thus adding another definite indication to surgical procedure. When the routine examination of the nose, throat, and ears includes the cervical and postcervical glands, thyroid and thymus, it may be possible to abort an incipient Graves' disease or pulmonary tuberculosis.

In moderate or severe thyroid insufficiency you may find a dry mouth and throat, with dyspnea on exertion. Voice husky or thick, defect or change in speech. Mucous membrane of upper air passages may be swollen or dry. Laryngeal muscles may show insufficiency. There may be perversion of taste. Later in the disease hæmorrhages from the nose, throat, or lungs are common. Treatment of the thyroid condition is indicated, but if improvement does not follow upon medical treatment, operative interference should not be postponed. In all cases of thyroidism an examination of the nose, throat, and ears is essential.

GRIENFIELD SLUBER: I have started observations in the Children's Hospital in St. Louis, and a considerable number of children have been studied as well as adults, by me, in which there seems a clinical relationship between the lymphoid ring and the thyroid gland. The development of this district is by no means clear in the minds of anatomists. Just exactly what parts the various sections of the lymphoid ring develop

is not settled. That the lingual tonsil develops from the same bronchial arch of the thyroid is a fact, and in early fetal life there exists the thyroglossal duct, which is closed before birth. It is sometimes found in the dissecting room. I have many times sought for this duct in the living, but have not found it. Dr. Shurly reports a singular betterment by the removal of the faucial tonsils. My observations have been relative to the lingual tonsil, and in one case in which I did a perfect tonsillectomy some years ago I found a goitre this winter. The treatment in that child with a lingual tonsil resulted in marked shrinkage of the goitre, which was a simple hypertrophy. I have a considerable number of adults under observation, one young man of probably twenty-five, with an enormous adenoma in his neck that in the course of three months has shrunk some three-quarters of an inch in circumference. The gland is softened, and the sense of comfort is greatly increased. That is the type of simple hypertrophy. Of hyperthyroidism I have had five cases. In four there was marked improvement by applications to the lingual tonsil. One was a case of long standing, operated on once or twice, in a woman by no means intact otherwise, who has so far not been improved. In another case of high grade, striking exophthalmos, and moderate adenoma, with a sense of impotency and general nervousness and tremor to such an extent that the patient was unable a short time since to feed herself, the first application to the thyroid gland was followed by a sense of betterment which she described as less tension. In the other cases under observation the thyroid has softened and shrunk, and in one very distinct and another less distinct has the exophthalmos receded. In one case in a child I saw the thyroid swell over night as the result of laryngeal tonsillitis: the tonsillitis got well, and in a few days the thyroid returned to normal size. With regard to the application, it is silver in varying strengths up to a saturated solution, and salicylic acid in alcohol in saturated solution.

GEORGE B. WOOD: The relation of tonsillar infection to the production of hyperthyroidism was first called to my attention by Dr. Musser, with whom I saw a number of cases. One case in particular was that of a trained nurse who had recurring tonsillitis and exophthalmic goitre and hyperthyroidism following tonsillitis. The removal of her tonsils stopped the attacks for six months, and her goitre began to go down and the exophthalmos disappeared. At that time she had slight sore throat, followed by a less severe attack of hyperthyroidism, and after this attack I found on examination that at the operation I had not completely removed the faucial tonsils, there still being a piece in the upper part, removal of which has cured her, and she has had no more attacks. I have seen a few other cases. The thought in my mind was not of the relation of the lymphoid ring directly with the thyroid gland, but rather that we had an infective process originating in the ring which upset the metabolism of the body so as to produce goitre and hyperthyroidism, and that was also the view Dr. Musser held, and he believed that almost all goitres and all cases of exophthalmos with goitre were more or less associated with some form of cryptogenic infection, and that if such infections could be located and removed, the results would be good.

HENRY L. SWAIN (New Haven): I have long associated the connection between the hyperthyroidism and the tonsillar ring, but I had only put them as occurring in the same individual, and that any infectious process in a patient with Graves' disease would exaggerate the symptoms. I have known this to occur with antrum disease, with lingual tonsils, and inflammation of the lateral columns of the pharynx. This I say, in

spite of the fact that there are numberless cases which must have occurred to all of us in which the relation was established in this way, that in patients for lingual tonsil affections we find that they cannot wear a tight collar where there is an acute exacerbation of the lingual tonsils. I had not thought they were directly connected, and that any phenomenon of internal secretion could exist between the two conditions.

GEORGE E. SHAMBAUGH: Dr. Shurly's paper brings out a point of great importance—the necessity of associating ourselves in our work with other fields of medicine, especially with the internist and his work. We too often isolate ourselves. We have been interested in these problems of Dr. Shurly's in the Presbyterian Hospital for a number of years, and our view has been along the line suggested by Dr. Wood, that there is a focus of infection in the throat which causes it. The whole phenomenon of thyroid disease has been that developed from an infection; it may be a bad tooth, an alveolar abscess, but usually it is an infection gaining entrance through the faucial tonsils. The recognition of a chronically infected tonsil is very often overlooked. With the history of recurring attacks of sore throat, etc., anyone may recognise the possible relationship, but to find the chronic infection of the faucial tonsil is more important when there is no history of such disturbance. Sometimes the history is of an attack several years previously, and in such cases a pus pocket may be found which has given no symptoms. I have often been asked to remove the tonsils where the patient was suffering from systemic infection, since this was considered to be the source of entry; careful examination of the tonsils will probably show nothing externally to lead you to believe they are responsible, but after removal frequently an abscess will be found at their base.

BURT R. SHURLY (in closing): I would like again to call attention to the great interest these cases should have for throat surgeons, and how frequently they are missed. Almost all the patients are of neurotic tendency, and such have an awful life to lead, and if we can find some few of them exhibiting these disturbances of the thyroid, it will be of great benefit to put these people on the right track.

Laryngitis Submucosa Subglottica Acuta.—Charles W. Richardson (Washington, D.C.).—The writer gave a brief history of the condition, and why he preferred the name given to any other designation of the condition. His attention was first called to this disturbance during the early days of his extensive intubation practice. The disease is most frequent in child life, though no age is exempt. The condition is apt to be implanted upon a severe laryngitis—a sequela of the infective diseases—or produced by foreign body or other sources of local irritation.

There may be more or less general inflammation of the larynx, but this is not always markedly present. The characteristic inflammation of the submucosa manifests itself in the subglottic portion of the larynx. The symptoms are slight hoarseness (often absent), stridulous breathing, and bellowing cough. There is no marked evidence of interference with aeration of the blood, as in diphtheritic stridor. The development of the embarrassment to respiration is more gradual than in laryngeal diphtheria. Inspection demonstrates two bright red bands located immediately below the vocal bands, nearly or quite meeting in the middle line. This condition was differentiated from laryngeal diphtheria by the author. The treatment indicated is quiet in bed, depleting by the skin and bowels, local use of ice externally, and silver nitrate in 1 per cent. solution

(if possible), and ammonia bromide, carbonate, and tincture of aconite internally. Intubation becomes necessary if the respiration is seriously embarrassed.

THOMAS H. HALSTED: As I understand it, there is palsy of the vocal cords in the subglottic region and deposition of lymphoid tissue, which becomes actively inflamed and hypertrophied at times, just as do the tonsils in the upper part of the throat, and I have always felt in these cases that we have an acute inflammation of that tissue. And, therefore, it has seemed to me that in the cases which I have seen most commonly they were in children with enlarged tonsils and adenoids—that is, the children would have recurring attacks. These cases are always, especially when severe, anxious ones, because there always comes up the question of possible diphtheria, and the general practitioner usually makes a diagnosis of diphtheria in the more serious cases, and it is a serious matter for us very often to oppose that diagnosis.

BURT R. SHURLY: Ordinarily, I think practitioners differentiate between acute laryngitis and membranous laryngitis, and this particular difficulty is not one that is ordinarily differentiated. Those of us that have done intubation work realise the peculiar conditions found in the subglottic region of the larynx, and the loss of voice in these cases is apparently the thing which attracts our attention to this variety of laryngitis, and one which would put us on our guard as to the proper differentiation. Of course, the cases for the most part are those which are met in the homes of patients, and the difficulties of examination and actually observing the swollen ring is quite apparent, and usually we have been called to these cases to do an intubation or some operative interference for a case of membranous laryngitis. The danger of not differentiating is a very great one, because by far the high mortality would come on the side of the membranous form of inflammation. I have intubated a number of these cases that were decidedly urgent, and where this was the only thing to do to save the life of the child, and practically all these cases got well with intubation. The point of doing a sufficiently early intubation is well taken, from the fact that a child suffering from long continued dyspnoea is in great danger of developing a pneumonia or some pulmonary condition. Of course, the differentiation from a foreign body is also a thing which should be prominently in mind.

EMIL MAYER: There is one condition that has not been brought out, which is exemplified in a case under my care. A nurse in the Mt. Sinai Hospital had a good deal of dyspnoea, and it was suspected she had diphtheria, although the cultures were negative. She was placed at once in isolation, where I saw her. Examination of the larynx showed the swelling Dr. Richardson has mentioned, and I felt it might show itself to be a case of subglottic infiltration. Nevertheless, I took the swab of the ordinary diphtheria culture outfit, bent it at right angles, and introduced it below the cords into the trachea, and got the cultures of Klebs-Loeffler bacilli there. There was nothing high up in the larynx, but it was in the trachea. She went through a most terrible time, but eventually recovered. In regard to the treatment, I do not recall that Dr. Richardson brought out the great benefit from small doses of adrenalin applied directly to the parts, and when the acute inflammation had subsided, the advantage that iron applications produce in the healing of these conditions as the patient improves.

WILLIAM E. CASSELBERRY: I am certain that this disease is deserving of a name of its own, and that it should be described as an entity. It is not always a false croup, or non-diphtheritic croup, or spasmodic laryn-

gitis; the distinction which he makes is as to the progression of the dyspnœa—the constancy is the best clinical distinction between the entity of subglottic laryngitis and the other forms just named. In subglottic laryngitis there is often that swelling beneath the cord, but when the condition is not at its worst the child breathes freely, especially in the daytime, and the attacks are paroxysmal. In the membranous form you cannot be so certain, because the membrane covers the subglottic portion, but on the wane and in the beginning I have seen the subglottic inflammation. The disease is by no means limited to children, even in those instances in which they may be taken for angio-neurotic œdema. I have seen several well-pronounced cases with fair voice and continuous dyspnœa in adults. I remember a woman who came to me with the history that she was subject to croup which would last about a week and she would feel that she must suffocate. She had been intubated on more than one occasion. The mirror showed a typical picture of subglottic laryngitis.

HENRY L. SWAIN: Thirty years ago, when I first yearned to look into a larynx, there were certain cases known as chondritis hypertrophica inferior; they went through acute exacerbations. Since then I have seen these cases in adults where they have the history of attacks of choking, I always thought them acute exacerbations for which there seemed no very good remedy. In two cases I remember using almost full strength nitrate of silver, and in one the galvanocautery, but I reduced the chronic hypertrophy only very slowly.

THOMAS HUBBARD: This condition is more common than is usually supposed. I have three cases in mind which I labelled subglottic œdema in children. Two were treated in the routine way, as though diphtheritic; the antitoxin made no difference, but in two cases in particular there was a copious flow of serum immediately upon the introduction of the tube, and there was such a quantity that there was no mistaking it. Diagnosis with the mirror I have also made, and I would take issue with the method of treatment as stated by Dr. Richardson. I think the proper line of treatment should be copious diaphoresis; if we could establish this when sure of the diagnosis, it is the best remedy. In one case where the diagnosis was made with the mirror, this treatment was very promptly successful.

CHARLES W. RICHARDSON: I wish first to endorse what Dr. Casselberry has said. He suggests passing the mirror into the pharynx and raising the epiglottis in order to get a rapid view. Although Dr. Hubbard thinks his treatment differs from mine, he agrees most thoroughly, because my method of treatment also produces diaphoresis.

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(Continued from p. 447.)

Symposium: Aural Complications of the Exanthemata.

(a) *Ætiology, Diagnosis, and Treatment.*—CHARLES R. C. BORDEN (Boston): The present communication is practically a continuation of a

paper, presented at the Ninth International Otological Congress, in Boston, in 1913, based upon a study of the aural conditions found in 454 autopsies after death from diphtheria, scarlet fever, and measles. Only aural complications of exanthemata are considered, and not aural diseases in general, and only severe cases, such as are seen in hospital practice, not the mild variety usually encountered in private practice.

Aural complications in the exanthemata occur in from 5 to 45 per cent. of clinical cases, as stated by different writers. In fatal cases this percentage was found to be greatly increased. In the autopsy reports upon which the paper is based the percentage in diphtheria was 82, in scarlet fever 94, and in measles 100 per cent. One would naturally expect unrecognised and untreated middle-ear inflammation or mastoiditis to go on to meningitis, brain abscess, and jugular thrombosis, but the autopsy records showed only four cases of septic meningitis (not necessarily of middle-ear origin), one case of infection of the jugular vein, and not a single case of brain abscess. Complications in the heart, pleura, joints, and kidneys, on the contrary, occurred with startling frequency. While it could not be held that all of these complications arise from middle-ear disease, a certain number are. Age is usually an important factor. Generally speaking, the younger the patient the greater the susceptibility to aural complications.

The symptomatology of the aural complications in the different exanthematous diseases is given in brief detail. The most striking variation between the three diseases—diphtheria, scarlet fever, and measles—is in the appearance and characteristics of the pus found in mastoiditis at autopsies in diphtheria. In scarlet fever and measles it is of the ordinary variety, and is usually copious in amount. In diphtheria it is repeatedly described as green, yellowish green, brownish green, or other colours bordering upon a greenish hue, and as being thick, tenacious, gummy, gelatinous, or semi-solid, etc. The marked peculiarity of the discharge may largely account for the lack of active symptoms which seem to be peculiar to aural complications of diphtheria.

As the infection in aural complications of contagious diseases reaches the middle ear by way of the Eustachian tube, and the nose and nasopharynx are the seat of active inflammations, these would seem to be the structures to which preventive measures would be aimed, but experience and practice have proved otherwise. Irrigation of the nose and nasopharynx, which was formerly so commonly practised, is now considered by the physicians and aurists at the Boston City Hospital to be absolutely contra-indicated, under any circumstances, and this includes all sprays and douches, as well as aural irrigations.

There is but one true method of preventing aural complications, viz., through the removal of adenoid tissue *before* the patient contracts a contagious disease.

Inasmuch as aural complications are usually well established before attention is called to them, the treatment is almost entirely surgical. In general it is the same in ordinary aural practice, with one or two exceptions. The important difference is the low vitality of the patient and the increased virulence of the infection. Nature is to be relied upon less in such cases than at other times. Middle-ear inflammation which might be aborted under other circumstances fails to respond to the usual mode of treatment in contagious diseases. The ordinary methods of treatment are not available. If the drum membrane is found to be red and inflamed, paracentesis is indicated. Hot irrigations seldom accomplish the desired results. Inflation of the middle ear and post-nasal applications not

only avail nothing, but decidedly increase the inflammatory process. The inhalation of hot steam is a safe procedure, but usually fails to give relief. Free paracentesis is the only accepted method of procedure, and should not be delayed. Hot irrigations are advantageous. As the discharge becomes less in amount it is often better to discontinue the irrigations and to substitute warm peroxide.

The sudden cessation of a discharge that has been profuse should at once direct attention to the mastoid. Whenever the middle ear is suspected of being the primary source of infection in complications of a serious nature and free paracentesis has failed to control the aural inflammation, the mastoid should be opened at once.

Summing up the treatment of aural complications in exanthemata, two methods are efficacious, viz., hot irrigations and paracentesis.

STANTON A. FRIEDBERG (Chicago). (By invitation.) In considering the aetiology of the aural complications arising during the course of the exanthemata, it may be broadly stated that their number and severity will depend upon the class of patients and the character of the epidemic. Other factors that must be taken in the light of predisposing and contributing causes are age, climate, season, physical condition of patient, condition of the upper respiratory tract, the specific infective disease, cross infections and systemic complications.

There can be no hard and fast rules established with reference to the diagnosis of the aural complications of exanthemata. In most cases conclusions in regard to the aural condition are reached in the same manner as in ear infection from other causes.

The treatment of aural complications naturally divides itself into preventive and curative. The preventive treatment aims at the alleviation of the accompanying nasal and pharyngeal conditions. Early treatment depends on the conditions present. Paracentesis and hot irrigations are advocated. The maintenance of drainage is important. In cases in which the aural discharge persists for several weeks, despite the most careful attention, consideration may be given (1) to the use of vaccines; (2) to the correction of conditions in the upper respiratory tract which contribute to a continuance of the infection; (3) to the mastoid operation to provide for better drainage from the antrum and middle-ear cavity.

The treatment of the more serious complications does not differ from that pursued in cases arising independent of infectious diseases.

In concluding the author emphasises the following points: (1) The closer co-operation between the attending physician and the aurist in private practice. (2) The necessity of competent aural surgeons being in attendance in contagious disease hospitals. (3) The isolation of patients in these hospitals at least up to the period of convalescence, lessening the liability to cross infections. (4) The necessity of the closest attention to patients, which includes routine examination of the ears in at least the younger patients, and careful observation and treatment when symptoms of aural extension arise.

Dr. HENRY O. REIK thought the matter might well be brought more closely to the attention of the general physician, and he hoped each author would take it upon himself to force it home to those who have charge of infectious disease hospitals. Dr. Friedberg had called attention to the importance of this in referring to the frequency which aural infection takes place in infectious diseases. Dr. Reik had recently observed, in one large hospital in which 400 beds were allotted to diphtheria and scarlet fever, that practically no attention was paid to [the

middle ear. Tympanotomy was rarely performed, and the ears rarely examined; the attendant waiting until the child complained of pain. Practically one third of all the cases had spontaneous perforation and otorrhoea, and a large percentage of these went out of the hospital with discharging ears. The number of complications which resulted could not be estimated in figures. In a similar hospital in Baltimore the same conditions pertained in 1912. With the advent of a new superintendent in 1913 the situation was changed. An otoscopic examination was made in every case admitted, and examinations daily after admission—one in the morning, one at four o'clock, and one at night. Thirty-seven patients had developed some indication of otitis media. The examiner was very keen to observe this condition, and if there were any doubt as to the need of paracentesis he would operate. Each one of the thirty-seven had tympanotomy, and each child was dismissed with dry ears. In 191 cases of scarlet fever every patient went out without otorrhoea. That showed what could be done with careful observation and examination. Dr. Borden referred to mastoiditis without tenderness. The speaker called attention, in this connection, to the fact that there is an instrument for measuring the presence and amount of tenderness, or rather, the amount of pressure necessary to elicit tenderness, which is much more accurate than measuring it with the thumb and finger. The algesiometer was a very simple device, consisting of a rod working in a cylinder, with a spring arrangement for measuring grams of pressure. This apparatus could be placed directly over the antrum or over the tip cells. With this instrument it was often possible to elicit tenderness which the thumb and finger would not detect.

JOSEPH C. BECK said that every large hospital should have a contagious ward, in charge of physicians and nurses specifically trained for these diseases. Attending physicians should be called only when absolutely necessary. Another point to which he wished to refer was the matter of operating upon the nasopharynx and tonsils while the patient is still in the hospital. He had seen a large group of cases operated upon with excellent results, particularly with reference to recovery from the nephritis which is going on without typical findings in the urine or other manifestations elsewhere in the body. In a large hospital where operations could be performed under the most advantageous circumstances, especially with reference to the anæsthetic, very satisfactory results could be obtained. He thought the open method of anæsthesia a distinct advance. With reference to *post-mortem* changes in the ear, Bezold's latest statistics showed that these changes are *post-mortem* unless the autopsy is very promptly made.

WILLIAM B. CHAMBERLIN (Cleveland) mentioned a case of aural complications of scarlet fever which had come under his observation during the winter. The patient was a man, aged thirty-five, whose drum membrane had ruptured spontaneously without premonitory symptoms. He was still in bed, the scarlet fever infection having almost spent itself. There was still a profuse discharge from the ear, but no signs of mastoiditis. One morning the nurse noticed a swelling behind the ear. He operated, finding the most extensive mastoid process he had ever seen and every cell filled with pus and granulation tissue. He called attention to the value of the X ray in making a diagnosis in the class of cases under discussion. Dr. Ingersoll and he, at the Lakeside Hospital, had X-ray examinations made in all cases. In chronic cases he did not rely so much upon it, but in acute cases it was of the greatest value. In questionable cases he thought the simple mastoid operation would do no harm if there proved

to be no mastoid involvement. It was attended with little danger. Should there be mastoid involvement, failure to operate would do great harm.

A. P. VOISLAWSKY (New York City), asked if the essayists were able to stop the aural discharge. He had had a great deal of trouble in having to keep children week after week on account of his inability to check the otorrhoea.

GEORGE M. COATES (Philadelphia) referred to the value of vaccine therapy in the management of the conditions under discussion. He called attention to a report of McKernon, made to the Society in 1910, in which he stated that by the use of autogenous vaccines in cases of mastoiditis following measles and scarlet fever upon which he had operated, the time for wound healing, which is usually much prolonged in these cases, was reduced to the normal. A report of Weston and Kolmer, in 1911, shows the results of 100 cases of suppurative otitis media (scarlatinal) treated with autogenous vaccines. Their work was done in the Philadelphia Hospital for Contagious Diseases. Under old methods of treatment, according to the histories of many hundreds of cases, it was found that the percentage of dry ears obtained under thirty days was only 7.46. With the use of bacterins this was increased to 22.9, which is a considerable gain and a fair index of the value of bacterins in this class of cases. Undoubtedly more dependence will be placed on this method in the future.

Dr. DUNBAR ROY (Atlanta) agreed with Dr. Borden with reference to the irrigation of the nasal chambers in exanthematous conditions, believing that it produced more irritation and gave rise to more possibility of infection of the middle ear than if it was omitted. In the later stages, when the discharge was very thick and muco-purulent secretion came from the nasal sinuses, it was sometimes pitiful to see young children trying to get air through the nasal passages. So long as the secretion existed it rendered them more liable to infection of the middle ear. In such cases he used a small rubber tube with a bulb at one end. By inserting the free end of the tube into the nasal passage of one side and blowing air through it, he had found it possible to blow through the opposite side large quantities of secretion. The secretion was thus prevented from going up into the Eustachian tube. The child was rendered much more comfortable by clearing out the nasal chambers in this way.

H. HOLBROOK CURTIS thought it would be better to suck the secretion out than to blow it up in the manner described by Dr. Roy.

Dr. TALBOT R. CHAMBERS (Jersey City) spoke favourably of the Yankauer nasal speculum, through which he had relieved the discharge in a number of cases of Eustachian catarrh, by means of iodine applications.

NORVAL H. PIERCE emphasised the importance of early paracentesis. It was absolutely necessary to resort to paracentesis early in order to prevent mastoid bone complications. If one remembered the anatomy of the regions involved—the aditus, the cavum, the pneumatic spaces, all communicating by minute tubes with the antrum, it would be easy to see that paracentesis can prevent involvement of the mastoid bone only when done early. At the very inception of otitis media the infection spread immediately down these tubes, and unless the paracentesis be done at a point in the course of the disease before the mucosa of the tubes swells one would be unable to draw off the infectious material by capillary drain or otherwise, and it would dam up in the pneumatic spaces. The muco-periosteum, as was well known, has the power of swelling enormously; no other tissue in the body having this power to an equal extent,

nor of exercising it so suddenly. In twenty-four hours it could swell sufficiently to fill a large pneumatic space. Paracentesis, therefore, did most good when performed early. It was the retention of discharge and the swelling of the muco-periosteum that produced decalcification of the bone and consequent mastoid involvement.

THOMAS J. HARRIS thought this symposium one of the most important which had come before the Society in many years. He regretted that the general practitioner could not have joined in the discussion. He asked the essayists, in closing the discussion, to speak particularly of the prevention of the complete destruction of hearing following the exanthemata. Milligan, of Manchester, had advocated the mastoid operation of post-auricular drainage in these cases.

FRANCIS P. EMERSON advocated frequent inspection, and, if in doubt, incision of the drum. He cited a case in which the patient, when first seen, had no other symptom than fever. He decided to wait, and four hours later the drum ruptured spontaneously.

Dr. FRIEDBERG, in closing the discussion, maintained that the majority of acute otitis cases would recover if properly handled. The result depended largely, as Dr. Borden had said, upon the virulence of the infection and the vitality of the patient, but ordinarily the percentage of recoveries was large. In the series reported there were two cases out of thirty-five dismissed from the hospital with discharging ears. This showed what could be done by proper attention.

The Exploratory Opening of the Sphenoidal Sinus.—Charles Prevost Grayson (Philadelphia).—By this exploratory opening is meant one that can be made so extemporaneously, with so little discomfort to the patient, so little derangement of his ordinary pursuits, that it may be employed for merely exploratory or diagnostic purposes. The artificial opening advocated is made on the anterior wall of the sphenoidal sinus, at a point as close as possible to the angle of junction of its floor with its internal wall. As regards the safety and facility with which it is made, this opening is on a par with the puncture of the nasal wall of the antrum beneath the inferior turbinate, or with the simple enlargement of the ostium frontale by means of the rasp or other instrument. This opening can be utilised for both exploratory and therapeutic purposes, and it has the advantage of not involving either the destruction or the crippling of any of the functionally valuable intranasal structures.

The technique of the operation is as follows: The inner or nasal portion of the anterior surface of the sphenoid body is exposed as widely as possible by shrinking the turbinates with one of the adrenal preparations. The field of operation is anaesthetised with cocaine and then rendered ischemic by the adrenal solution. When this has been done, the course of the sphenopalatine artery is usually so distinctly visible that it can be readily avoided. The application of a dilute tincture of iodine will be sufficient for purposes of sterilisation. The instrument with which the sinus wall is perforated is a straight drill, tipped with a corundum burn 6 mm. in length and measuring 2-12 mm. from its point to its greatest diameter. The drill is applied 2 or 3 mm. above the line which divides the anterior from the inferior surface of the sphenoid body and close to the attachment of the ethmoid plate in the middle line. The opening it makes is 2 mm. in diameter, which is quite sufficient to permit the escape of any fluid within the sinus, the introduction of an appropriate irrigation cannula, or, should it seem advisable, the distal jaw of a biting forceps with which the opening may be enlarged. If the explora-

tion of the sinus proves to be pathologically negative, the breach will close within twenty-four hours.

In closing, the author reiterated that his object in exploiting this method of investigating the sphenoidal sinus is, in the first place, to dislodge the idea that the ostium sphenoidale should always be the starting-point for any operation upon the sinus; to lessen, if successful in this, the frequency with which the middle turbinate is unnecessarily removed, or, in other words, to substitute for a somewhat formidable and tissue-destroying operation one that is technically simple and unattended by any loss of functionally useful tissue; to lessen, also, the hesitation with which some thoroughly qualified men contemplate the surgical invasion of this sinus.

H. HOLBROOK CURTIS defended the usual operation of opening the sinus through the natural orifice, for the reason that the frequent excursions of the cell described by Sieur and Jacob, impinging on both the sphenoidal and antral walls, might, by injury, lead to an infection, and because the cell overhung the sphenopalatine fissure and ganglion, these structures, as well as the optic and superior maxillary nerves, might be injured in case Sieur's cell was entered by accident and infected. Dr. Curtis then went into the question of opening the inferior face of the sinus, which Dr. Grayson explained he had not advocated, and the remarks were withdrawn.

ROSS HALL SKILLERN was not in accord with the essayist as to the indications for, or the method of opening the sphenoid. Unless purulent secretion were present in the sphenothmoidal fissure in frank cases, or the typical pressure symptoms were present in the closed and latent type, he did not perceive the indication for exploratory opening. As to the method, he preferred the one which is constantly under control of the eye. This was nearly always possible in the presence of disease, for it was a well-known fact that a diseased sinus is always easier to sound than a healthy one, this being due to the enlargement of the drainage passages by the constantly outflowing of secretion. In his experience this was peculiarly adaptable to the sphenoid. Under these circumstances, after the sound had found the ostium and has penetrated into the sinus, it was a simple matter to introduce a small Hajek curette or an evulsor and to make a comparatively large opening in the anterior wall and at its thinnest part. All danger of penetrating the cribiform plate or completely missing the sinus was obviated. It would seem that this is really the safest and sanest method of approaching this cavity for diagnostic and therapeutic purposes.

FRANK R. SPENCER (Boulder) said one could easily use the Andrews' probe to find the opening. It was perfectly justifiable to remove the posterior half or one-third of the middle turbinate in order to expose the sphenoid cavity. The thin anterior wall could be broken down and an opening gained which would be large enough for therapeutic purposes. That could be done with cocaine anaesthesia in simple cases.

JOHN O. ROE said: It is not difficult to find the natural opening of the sphenoidal sinus, although I think Dr. Skillern has located it somewhat lower than I have generally found it. My own method of locating the opening is to pass the probe along the lower border of the middle turbinate, using it as a guide, then, by turning the end of the probe slightly upward, the sphenoidal opening is readily entered. In some cases the opening can be seen by anterior rhinoscopy when the middle turbinate is small. When the opening has been found, the cavity can be explored in every direction and any abnormalities dealt with as conditions

indicate. Since suppurative conditions are those most commonly found in these cases, free drainage of the cavity, as pointed out by Dr. Grayson, is of the utmost importance. This I have established most easily by taking away the lower wall with forceps cutting downward in an antero-posterior direction. In the removal of this bone, however, I have not often found it so slender and fragile as Dr. Grayson has indicated, but, on the contrary, usually quite hard and dense, sometimes requiring the use of the chisel. I might relate, in this connection, that a few years ago there came under my observation an exceedingly interesting case of *tic douloureux*, due to a myxomatous growth, occupying the entire cavity of the sinus, and on removal of this growth the *tic douloureux* subsided. When we consider the great anatomical variations in different skulls, in no case would I attempt to drill or chisel an opening into the sphenoid sinus without first having found the natural opening to serve as a guide for the operation.

TALBOT R. CHAMBERS (Jersey City) thought it better to start with the natural opening, enlarging it as much as necessary, rather than to make a second opening.

Dr. GRAYSON, in reply, could only repeat that in his opinion the chief objection to the usual method of opening the sphenoid sinus was that it was begun in what was a region of risk instead of being cautiously ended there. He thought it better from every possible point of view to begin the operation at the point he had designated. Anyone familiar with the normal anatomy of the sinus, as well as with its occasional abnormalities, must admit that this is the safest locality, not only at which to enter it, but from which to begin the removal of its anterior wall. The terms thick and thin which had been applied to this wall were purely relative, and when one spoke of its lower being thicker than its upper portion it meant no more than a difference of one or two millimeters, which was certainly of no surgical consequence whatever. It was scarcely conceivable that anyone with the delicacy of touch that the rhinologist should possess could inflict any injury through this operation. Its greatest merit, in fact, lay in its freedom from any unnecessary or concomitant injury. The opening was made under the direct inspection of the eye, and there was no flow of blood to obscure the field of operation. In the large majority of cases it was necessary to remove no more than the inner portion of the anterior wall, and he had yet to hear a single good reason for continuing the ablation of the middle turbinate in order that we might begin our sphenoid operation at its awkwardly and comparatively dangerously placed ostium.

A New Technique for the Removal of Intrinsic Growths of the Larynx.—Robert Clyde Lynch (New Orleans).—As perfect quiet is of the greatest necessity, the author insists on his patients being kept continuously in the surgical stage of anaesthesia, securing perfect relaxation of the parts, conducing to the most accurate work. Having obtained a perfect view of the larynx (using his modification of the Killian and Albrecht suspension apparatus), with that organ and its owner quiet, he proceeds as follows: In vocal nodules the affected cord is picked up gently, turned to nearly an angle of 45 degrees, in order that the under surface may be seen. The Killian baby forceps and Killian baby double cup forceps are used according to the size of the nodules. If the growth occupies the superior surface and is seen to involve mainly the sub-epithelial structures, the surface layer is split with the knife and the small tumour picked out with appropriate forceps. The surface membrane

is reapplied and the wound dressed with tincture of benzoin compound and collodion. In single pedunculated tumours the tumour is picked up with the forceps, encircling the base with a wedge-shaped incision, removing it by clear dissection with a knife. Single papillomata are grasped with forceps and shaved off below the level from which they spring. In the case of multiple papillomata the mass is grasped with Killian baby forceps and the entire area clearly dissected. Lest some small portion might be left behind, the whole surface is gently curetted, including the sub-glottic area.

Intrinsic epithelioma of the larynx is removed completely, by dissection through the mouth, the tumour being delivered in one mass upon a cartilaginous plate. A case cited by the author was the first on record, so far as he knew. The diagnosis and the fact of complete removal were verified by the microscope. By this method the tumour is removed in one mass without itself being disturbed by instrumentation or manipulation, which is the accepted surgery of malignant growths, thus diminishing the danger of recurrence.

The Proper Fields of Medicine and Surgery in Diseases of the Upper Air-Passages—**John A. Thompson** (Cincinnati).—One half of all the diseases of the upper air-passages are curable by medicinal means alone. An intelligent use of known methods in medicine will often prevent complications that make operation necessary. The common diseases of the nose and throat are easily separated for treatment into three classes: First, those the treatment of which is purely surgical, such as deformities, deflections of the septum nasi, chronic sinusitis, all tumours, benign or malignant, adenoids, hypertrophied tonsils, quinsy, retropharyngeal abscess, foreign bodies, hæmorrhage, and stenosis of the larynx. In some of these preliminary treatment makes the operation easier and the recovery surer.

The second class includes diseases where combined medical and surgical treatment is necessary. The most important, because the most frequent, disease of this class is hypertrophic rhinitis. After removal of the newly-formed connective tissue in the turbinates, an analgesic germicide that will at the same time relieve congestion, is indicated. Menthol meets these requirements. Camphor is similar to menthol in its local action, and can be advantageously combined with it.

Other conditions which require combined treatment are tertiary syphilitic ulcer, chronic granular pharyngitis, and œdema of the glottis.

The third class is chiefly represented by acute rhinitis. Other conditions which may be treated by medicinal measures alone are acute catarrhal sinusitis that often accompanies acute rhinitis, acute laryngitis, simple chronic rhinitis, chronic purulent rhinitis, atrophic rhinitis, chronic laryngitis, chronic tracheitis, and chronic bronchitis.

The treatment ordered to abort an acute attack, with variations to suit the individual, is first a sweat, however procured. To open the nose blocked by the swelling, a solution of adrenalin may be used every three hours. A saturated solution of boric acid may be advantageously employed to dilute the adrenalin. Where the patient is seen in the second stage of the disease and the serous discharge from the nose is annoying, a spray containing 1 gr. of atropin to 2 oz. liquid of petroleum is very effective.

Two cases of Vincent's angina successfully treated with salvarsan in glycerine were cited.

Emphasis was laid upon the utilisation of simple means, by which

much can often be accomplished in various affections of the upper air-passages.

[A paper by Dr. Beck read at this point has failed to reach us.—ED. JOURN. OF LARYNGOL., RHINOL., AND OTOL.]

JOSEPH H. ABRAHAM (New York City), with reference to Vincent's angina, wished to present a remedy which he had used in four cases of verified Vincent's angina. It consisted of pure carbolic acid, fused, and applied, upon a cotton-tipped applicator, to the ulcerating surfaces. Two applications were made a day—one when the patient came in in the morning, and the other in the afternoon. The acid was allowed to remain in contact with the tissues from two to five minutes, and then neutralised with pure alcohol. The patient was given a simple cleansing mouth wash to use at home. In three cases, when the patient was sent to the pathologist the next morning, no bacilli and no ulceration could be found. In the fourth case a few scattered organisms could be found in the tonsils and quite a number in an ulcerated tooth socket. He removed a root of a tooth, curetted in the cavity, and applied carbolic acid, and the next morning there was no culture. In each case the acid was used twice. Subsequent examination failed to reveal any bacteria, and the patient was dismissed with a cleansing wash.

LEE M. HURD considered intra-tracheal injections of various medications with oil one of the best methods of treating these inflammations. Intra-tracheal injections were not employed as much as they should be. In Vincent's angina any acid would do—trichloroacetic, strong nitric, or any acid or strong caustic. The spirillum would not be found the next day. In very severe cases salvarsan, as suggested, was good. The oily injections would relieve the chronic laryngitis, and was useful in chronic and acute inflammation of the trachea. Sweet oil or petroleum, about 2 drms., with some medication, injected into the trachea and bronchi had been found efficacious.

TALBOT R. CHAMBERS (Jersey City) referred to the theory of Sir W. Arbuthnot Lane, of London, concerning the use of petroleum. According to this theory, petroleum passes through the intestine and is not absorbed. Dr. Hurd advocates, in consonance with Dr. Thompson, the injection of 2 drms. into the bronchi: Dr. Chambers would like to know what becomes of that oil. If not absorbed, it would become a foreign body.

Dr. HURD said the vaseline which he used was probably absorbed.

THEODORE CORWIN (Newark) thought the intra-tracheal injections most valuable. Patients could be taught to make the injections themselves, using a long dropper and injecting 15 or 20 minims two or three times within ten minutes and repeating this every half hour, or hour, so long as the cough was annoying. He used vaseline or other oil in combination with menthol, 1 or 2 per cent., camphor 1 per cent., or anything that might be desired. For office treatment the tracheal syringe was preferable, giving doses of 1 or 2 drms. It should be preceded by a downward spray of 2 per cent. menthol to render the larynx less sensitive to manipulation with the syringe.

Dr. RICHARDS added that some years ago he used oils of one kind or another, and instructed his patients to use nebulisers. He had reached the conclusion that oils are nearly valueless. It was better to employ something corresponding as nearly as possible in specific gravity to that of the normal serum.

Dr. THOMPSON, in closing the discussion, said that when Dr. Harris

sent out his circular letter asking for suggestions concerning this meeting, he thought it wise to have several papers concerning the treatment of the diseases of the upper air-passages. Dr. Beck agreed to discuss the scientific side, while he took the therapeutic side of the question. He had endeavoured to discuss the matter from the point of view of everyday practice. The most important point, and one which he would reiterate, was expressed in the opening sentence of his paper: "One half of all the diseases it is our daily work to treat, are curable by medicinal means alone."

(To be continued.)

Abstracts.

PHARYNX.

Richardson, Charles W.—Indiscriminate Tonsillectomies for Remote Infections. "The Laryngoscope," 1915, p. 293.

Richardson says that it has been thoroughly ingrained during the past decade that the tonsils are the portal of systemic infection. The small-sized, buried tonsils, we are told, are the greatest offenders. It has even been stated that no adult should possess tonsils, nor even the site from which the tonsils had been removed. Richardson thinks that it is incumbent upon us to consider some of the indications for tonsillectomy. Even the layman nowadays considers himself competent to judge of the advisability of operation, and frequently says he has come to have his tonsils removed.

Independent of the tonsils there are many points which may be the origin of general infection. Richardson mentions the accessory nasal cavities, the mastoid antrum, the teeth, gall-bladder, appendix, and seminal vesicles. The writer allows that it is permissible to remove hypertrophied tonsils or those which are the seat of chronic lacunar infections, or of follicular tonsillitis, or abscess formation; he even admits tonsils which are painful on swallowing or tender on pressure. What seems to Richardson objectionable, however, is the frequent removal of tonsils which show no macroscopic evidence of disease. That the possessor of this type of tonsil may be the subject of an infection that cannot be accounted for does not justify the removal of the tonsil. Numerous instances can be enumerated of acute and chronic rheumatism and rheumatoid arthritis where tonsillar enucleation has been followed by total failure to obtain relief. Some practitioners send patients with the statement that they have expressed pus from the tonsil, but in the great majority of cases Richardson fails to confirm their findings. On the other hand, he meets with many cases in which patients come to him in the hope of being relieved of the faucial dryness due to tonsillectomy. The article concludes with the report of several illustrative cases.

J. S. Fraser.

Figdor, P.—Pericarditis in Diphtheria. "Proceedings of Royal Society of Medicine, Section of Disease in Children," June, 1915, p. 89.

The author reports the case of a boy, aged three, who was admitted to hospital for laryngeal diphtheria. Tracheotomy was performed shortly after admission, with instant relief.

The cardiac rhythm afterwards became irregular. Cyanosis developed, and also a rapidly increasing cardiac dulness.

Post mortem: The parietal and visceral layers of the pericardium showed recent pericarditis. There was about ten ounces of serous pericardial fluid. Great oedema of pericardium and of tissues at the root of the neck, including the thymus. No tubercle; no evidence of consolidation.

Arthur Ryland.

NOSE.

Onodi, Ladislaus (Budapest).—Congenital Teratoma of the Septum Narium.

Onodi observed in a new-born infant, four days old, with hare lip and cleft palate, two congenital tumours of the septum narium, which microscopically show the character of the teratomas. The anterior tumour was a myxoma covered with skin, pavement epithelium, hair follicles, sweat glands. The posterior tumour contained a large tooth. He has not found in the literature a similar case. The teratomata of the septum narium are very rare. The macroscopical and microscopical photographs were demonstrated.¹

Author's Abstract of Case.

EAR.

Maurice (Paris).—Auditory Re-education: Chronic Deafness and Acoustic Exercises. "Arch. Internat. de Laryng.," etc., 1914.

The author's remarks refer not to absolute deafness, nor to deaf-mutism, but to deafness with some vestige of hearing, deafness which has been acquired post-natally, after the sufferer had acquired speech. We have learned that the older clinicians were wrong in assuming that the degree of deafness varies directly with the degree of the anatomical lesion. Indeed, Zimmerman and Frey have shown that the ossicles subserve only sound-accommodation, not conduction. In agreement with this, the author has found that, as regards the prognosis in re-educating the deaf, Gelle's sign is valueless and stapes-ankylosis immaterial.

Urbantschitsch noted that unilateral deafness reduces the hearing-power of the opposite ear. And the author, in the course of treatment of the worse ear, has remarked an improvement in the hearing of the better ear. This must be a sympathetic or reflex action. From a psychological standpoint, we may have to deal with *aboulia*, in which the patient, often a neurasthenic, is too lazy to try to fix his attention for hearing. Or *phobia*, in which the patient is so frightened by increasing deafness that he fears entering into a conversation, just as an agrophobic fears crossing a road.

Either of these two psychological states creates a vicious circle. The existence of a psychological element may be suspected from paradoxical hearing, as in the case of a man who heard the watch at 35 cm., but a whisper at only 8 cm.; or when words are heard much better than sustained sounds.

¹ For a somewhat similar case, reported by Mr. A. R. Tweedie, see JOURN. OF LARYNGOL., RHINOL. AND OTOL., vol. xxvi, 1911, p. 80.

Re-education is not intended to supplant other local or general treatment.

All the special senses, when feeble, can be re-educated, in the same way as the muscular sense of the ataxic, or the writing-power of the agraphic. In any such re-education one employs the normal physiological stimulus. And the natural stimulus for an incompetent hearing-apparatus is the sound-wave.

Science, like Nature, proceeds by slow degrees, never by bounds. In the first century, A.D., Archigène recommended noise to stimulate a jaded sense of hearing.

The author passes in review various aurists since then who have recommended various instruments. Urbantschitsch employs the human voice and an accordion.

Re-education is of two types. (1) Passive: By means of waves of large amplitude, *i. e.*, loud sounds, which must be of pitch and timbre similar to the human voice. The sound is so loud as to force itself on the patient's attention. Acquired deafness should be treated by this passive re-education. (2) Active: The sound-wave, however produced, is of very small amplitude; the sound is so faint as to be barely perceptible to the patient, who must exert a great effort of concentration to hear it at all. Active re-education, supplemented by lip-reading and making the patient feel digitally the vibrations of the speaking larynx, should be used for congenital deafness which is not quite absolute; that is, for deaf-mutes with a slight perception for vowel-sounds.

H. L. Whale.

Collier, James.—Pontine Polio-encephalitis. "Proceedings of Royal Society of Medicine, Neurological Section," June, 1915, p. 71.

The case is one of a child, aged eight, who was taken suddenly ill with headache and fever. During the following two days he had a series of convulsions, vomited repeatedly, and was subconscious. Subsequently he was noisy and restless for a few days, and then seemed quickly to recover, except that he was completely deaf, and was very unsteady upon his legs.

He was completely deaf when examined a month after admission. Ears normal; vibration sense present; nystagmus; bilateral ataxy; titubation; cerebellar gait. Lumbar puncture normal. Wassermann reaction negative.

Under observation the cerebellar signs practically disappeared, leaving complete deafness as the feature of the case. *Archer Ryland.*

Holmes, E. M.—Aural Complications of Typhoid Fever. "Annals of Otology," xxiii, p. 555.

The writer has had exceptional opportunities for a study of this subject, and, in this paper, pays special attention to the difficulties of diagnosis in lateral sinus thrombosis occurring during typhoid fever.

Macleod Yearsley.

Young, H. B.—The Sociologic Aspect of Deafness, Congenital or Acquired, in Early Life, with a Suggestion for a Betterment through Indirect Effort. "Annals of Otology," xxiii, p. 827.

A most retrogressive paper, advocating the use of the sign-language generally among the deaf and hearing. Owing to the inability to hold water of its arguments, the publication of such a paper is strongly to be deprecated. *Macleod Yearsley.*

Keiper, George F.—Mastoiditis a Probable Cause of Acute Nephritis.
 "The Laryngoscope," 1915, p. 287.

Case 1.—Female, aged six, suffered from acute suppurative otitis media (right). Temperature 103° F., pulse 130. R.M.T. bulging and red. Paracentesis under local anæsthesia: very little pus. Next day patient no better. Urine showed a trace of albumin and many granular and hyaline casts. Right mastoid very tender. Patient treated for nephritis: diaphoresis, saline per rectum, purgatives, etc. Four days later temperature normal. As kidneys resumed their normal function the discharge from the right ear increased and the tenderness over the mastoid began to disappear. (Staphylococcus infection.) Patient recovered. The author remarks: "It is well known that nephritis may be caused by tonsillitis and peritonsillar abscess. Why not by mastoiditis?"

Case 2.—Female, aged fifty-two, had had acute suppurative otitis media for ten days; tenderness over right mastoid. Temperature suddenly rose to 103·8° F.; pulse 128. Severe headache. Patient admitted to hospital. In the evening temperature rose to 105·2° F. "Patient more stupid than ever"; sagging of meatal wall; pupils hardly reacting; patient semi-conscious. Immediate operation: large mastoid, cortex firm, little pus in the antrum but a considerable quantity in the posterior cells; sinus healthy. Urine was found to contain a large amount of albumin with casts. In spite of general treatment for nephritis, temperature continued high. Wound surface covered with false membrane. Odour of necrosis well marked. Hæmaturia present. Temperature rose to 107° F. just before death. No mention of *post-mortem*.
J. S. Fraser.

Bonner, H., and Dutrow, H. V.—Primary Mastoiditis. "The Laryngoscope," 1915, p. 244.

Male, aged sixty-five, suffered from influenza in January, 1915. One week later his doctor noticed slight œdema over the right mastoid process, and there was tenderness on pressure at the tip. The tympanic membrane showed slight congestion, which cleared up in a few days. The mastoid swelling slowly decreased, but the patient complained of fulness in the ear and dull pain in the mastoid. Otoscopic examination showed loss of gloss of the right drumhead, with slight congestion; tube patent: air and bone conduction normal; slight tenderness at mastoid tip; temperature and pulse normal. Next day the patient complained of noises in the ear, and there was slight sagging of meatal wall. Two hours later the patient had a sudden attack of dizziness and fell to the floor. An hour later he had a second similar attack. For a week the patient refused operation. *Mastoid operation:* Bone sclerosed; superficial cells contained viscid fluid, and, deeper, a large amount of thick yellow pus was evacuated. Extensive disease. Apparently the lateral sinus was opened accidentally, but this did not hinder an uneventful recovery. (It is a pity that the bacteriology is not mentioned, as the case appears to correspond very closely with the type of middle-ear inflammation associated with the presence of the *Streptococcus mucosus*.)
J. S. Fraser.

MISCELLANEOUS.

Whale, G. H. Lawson.—Perithelioma of the Superior Maxilla and Ethmoid.¹ "Lancet," May 15, 1915, p. 1013.

Patient, a female, aged fifty-two. Duration of disease, two and a half years. At the first operation only a portion could be removed. A second operation was undertaken some three months later, when the whole right upper jaw, palate bone, nasal bone, and part of the malar were removed, together with the right half of the ethmoid up to the cribriform plate. Save for an abscess in front of the right ear, recovery was uneventful.

Macleod Yearnsley.

REVIEW.

Operative Surgery of the Nose, Throat, and Ear, for Laryngologists, Rhinologists, Otolologists, and Surgeons. By HANAU W. LOEB, A.M., M.D., Professor of Ear, Nose, and Throat Diseases in St. Louis University, in collaboration with JOSEPH C. BECK, M.D., R. BISHOP CANFIELD, M.D., GEORGE W. CRILE, M.D., EUGENE A. CROCKETT, M.D., WILLIAM H. HASKIN, M.D., ROBERT LEVY, M.D., HARRIS P. MOSHER, M.D., GEORGE L. RICHARDS, M.D., GEORGE E. SHAMBAUGH, M.D., and GEORGE B. WOOD, M.D. In two volumes. Vol. I. 409 illustrations. London: Henry Kimpton. Glasgow: Alexander Stenhouse, 1914. Two volumes price £2 10s. net.

This is the kind of book that everyone who handles wishes to possess.

The surgical anatomy of the nose is dealt with by Dr. H. Loeb, and those who know the uncompromising way in which he has gone to nature in making his reconstructions of the accessory sinuses will expect from him an exceptional degree of thoroughness and accuracy. In this they will not be disappointed. The more or less stereotyped anatomy of the part is given with great detail, while the points of more especial importance to the rhinologist are emphasised by words and by illustrations. Almost every possible aspect of the sinuses and other parts of the nose is shown and amply delineated. A specially good bit of work is the study of the relation of the optic chiasma and nerve to the nose and accessory sinuses. The nasolacrimal duct and the hypophysis also receive the fullest attention from the nasal aspect.

Dr. Wood, of Philadelphia, is responsible for the surgical anatomy of the pharynx, larynx, and neck, which has all the minuteness of the descriptive anatomist with very special consideration of the parts and relations of the parts in which the laryngologist is peculiarly interested. The discussion of the region of the palatal tonsil from the outside gives a very striking idea of the arterial supply of that organ. There are some beautiful illustrations of the lymphatic glands of the neck taken obviously from diseased subjects, and the relations of the facial nerve and the venous structures in the carotid triangle are particularly good.

It would be difficult to find an author with a more distinguished name than Dr. Shambaugh as an authority on the anatomy of the ear, and

¹See JOURN. OF LARYNGOL., RHINOL., AND OTOL., August, 1915, p. 315.

accordingly we have a complete and reliable chapter on it from his pen. Accurate as is his description of the topography and surgical relations of the sigmoid sinus and jugular bulb, we could wish that he had allowed himself a little more space in order to make the descriptions of these tortuous channels somewhat clearer.

Dr. George W. Crile supplies an excellent and encouraging chapter on the external operations on the larynx, pharynx, upper œsophagus, and trachea. Two very instructive sections are devoted to the consideration of the special difficulties and dangers, the two chief being pneumonia and mediastinal abscess. As the best method for constructing a barrier for the mediastinum he advises the fixation of the trachea by preliminary operation, making a low tracheotomy and opening the deep planes of the base of the neck, and then packing them with iodoform gauze. In the case of temporary tracheotomy he advises transverse incision in the trachea, which he practises as the first stage of laryngectomy. The technique of laryngectomy is detailed. In cases of extensive cancer of the pharynx and œsophagus he dwells upon the avoidance of re-implantation of cancer cells, stating that "no instrument, no finger, no sponge that has touched the cancer surface should be used again, nor should they touch anything else that may be used in the operation." To prevent the re-implantation of cancer cells he advises "immediate and complete destruction of the original growth by thermo-cauterisation," and he follows the operation by the use of the X ray if the field is accessible. In excision of the tonsil for cancer all the visible growth is completely destroyed by thermo-cauterisation before the dissection of the base of the growth is made. He seems to deal somewhat lightly with the diverticula of the œsophagus, in which he cuts off the sac "exactly as one cuts off a hernial sac." The literature of this subject describes the difficulties which some operators have encountered, and which they have suggested should be met with by twisting up the sac, ligaturing it, and leaving it *in situ* for some days. The cases no doubt vary considerably in their difficulty, and, as he says, diverticula with narrow necks are, of course, the easiest to remove.

When we say that laryngoscopy, tracheoscopy, bronchoscopy, œsophagoscopy, and gastroscopy have been left in the hands of Dr. Harris P. Mosher we need hardly add another word with regard to the chapter. The convenience of suspension laryngoscopy would seem to be greatly increased by the use of a folding frame devised by him for the apparatus. The anatomical illustrations will remove many difficulties and explain many endoscopic pictures by which the tyro is apt to be puzzled. The normal œsophagus during deep respiration, that is to say, in its thoracic portion, seems to us to be more smoothly cylindrical during inspiration than it is represented to be in Fig. 173. Some most instructive X-ray pictures are given: one shows admirably the irregular cone seen at the point where the œsophagus reaches the new growth, as demonstrated after a bismuth meal. In the treatment of œsophageal diverticula great stress is laid upon the importance of attempting treatment by dilatation of the orifice of the œsophagus before thinking of excision of the pouch. The writer suggests that the common wall between a small pouch and the œsophagus may be cut by means of operation through the œsophagoscope, which, he says, "some day may seem feasible." Many of us will be content to wait and see. We venture to think that there is no point which the writer has left untouched, and the classic safety-pin receives due attention. We sometimes wish that the safety-pins now in vogue were made of poorer and more pliable metal.

Dr. Joseph Beck treats the subject of plastic surgery of the nose and

ear as if he loved it, and we doubt whether there is anywhere to be found such a complete account. It is rather strange that the first public description of the Indian method of rhinoplasty published in this country appeared in a lay journal, *The Gentleman's Magazine*, vol. lxiv. The classification of the methods of procedure in nasal deformities and malformations is very comprehensive, including the German or French method (including skin-grafting), the Italian or Tagliacotian, the Hindoo or Indian, the double transplantation (toe to hand, then to nose), the finger method, the clavicle method, the implantation method (paraffin, etc.), the reduction method, the prothetic or artificial method, the orthopædic, the intra-nasal method (closing perforation of the septum, etc.), etc. Due prominence is given to Watson Cheyne's, Walsham's, Lack's, and Roe's operations. Wealth of illustration renders the descriptions unusually intelligible. The various forms of nerve anastomosis for facial paralysis are admirably described, and we only regret that the author has not specified which of the methods he specially recommends and what the end results have been, nor does he make it quite clear as to the diagnosis of the cases in which recovery without operation is impossible or nearly so, and in which a good result from nerve anastomosis may be expected. The technique of the operation has, however, been perfected to the highest degree, and this article places it in a very clear light.

There is no index to this volume, but the analytical table of contents will probably satisfy all requirements. Take it altogether the operating specialist cannot afford to do without it, and he will look forward with impatient interest to the appearance of the second one.

Dundas Grant.

NOTES AND QUERIES.

The last copy of the *London Gazette* announces that the King has been pleased to grant his permission to Sir StClair Thomson, M.D., to accept and wear the decoration of Commander of the Order of Leopold which has been conferred upon him by the King of the Belgians in recognition of valuable services.

We understand that this Order is the principal one in Belgium, and that it has been bestowed for services in rhino-laryngology rendered both in this country and in Flanders.

BOOKS RECEIVED.

Peroral Endoscopy and Laryngeal Surgery. By *Chevalier Jackson, M.D.*, Professor of Laryngology, University of Pittsburgh; Consulting Laryngologist, Bronchoscopist, Oesophagoscopist and Gastroscopist, Western Pennsylvania Hospital; Laryngologist, Presbyterian Hospital, etc., etc. First edition. Quarto volume of 705 pages, 490 illustrations and 6 coloured plates. Cloth \$5.00, postage extra. The Laryngoscope Co., Publishers, St. Louis, Mo. 1915.

Transactions of the Thirty-sixth Annual Meeting of the American Laryngological Association. May, 1915.

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